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IBM Adds, Divides . . . and Multiplies?

Unbundled System Extends Small Line

By Esther Surden
Of the CW Staff

ATLANTA — IBM has taken the plunge and unbundled operating software from the hardware price of the System 34 announced here last week by its General Systems Division.

At the same time, however, the firm placed several functions previously contained in operating software into microcode on the system, billed as a disk-based, on-line business system that can accommodate multiple workstations and multiprogramming.

IBM previously announced separate charges for operating systems on its Series/1 minicomputer, but that machine was seen as a bare-bones, hardware-oriented product to compete in the mini — not systems — market.

With the System 34, the System Support Program (SSP) is available on a license fee only — at a charge of $85 every month.

There is no System Control Program for the 34, IBM said, but added the SSP does not contain all the func-

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Firm Takes Scissors To More Price Tags

By E. Drake Lundell Jr.
Of the CW Staff

WHITE PLAINS, N.Y. — Hurry, hurry, hurry . . . Prices slashed on discontinued items . . . Get them while they last . . Some products get double markdown . . . Hurry, hurry, hurry . . .

IBM's almost beginning to sound like an appliance or car salesman trying to get rid of last year's line when a new one is on the way.

The firm last week announced its third price cut in less than three weeks, this time involving the 370/115, 370/125, 370/135 and 370/145.

And the picture of a clearance sale is reinforced by the fact that none of these products is in "new" production.

On March 25, prices were cut on the 370/115 and 125 memory; the new reductions of approximately 20% on processor purchase, lease and rental rates amount to a double markdown for the units — or, in the appliance salesman's vernacular, "double pricing whammy."

On the 370/135 and 145, the reductions apply only to purchase items and amount to approximately 20% on

(Continued on Page 2)

All Signs Pointing To New Generation

By Ronald A. Frank
Of the CW Staff

NEWTON, Mass. — A major new generation of IBM mainframes combining both hardware and software innovations is being fine-tuned for imminent introduction.

The continuing price cuts that now have blanketed the entire 370 mainframe line indicate the industry leader is clearing the decks for tomorrow's mainframes. Rather than announcing the start of a new generation as it did with the first models in the 370 line, IBM has been phasing key elements of its new machines into its equipment arsenal for some time. These elements are expected to come together in the new family of machines that could see the first model announced as early as this fall, according to industry analysts.

A major feature of the new IBM series could be the use of bubble memory technology. On a cost/performance basis, the current dense MOS memory is still less costly, but not by much. It would not be out of line for IBM to begin a new family of mainframes with bubble technology in at least a portion of the CPU, if not the main memory itself, industry observers said.

The bubble technology could be effective as a paging device to replace a fixed-head disk. Designers generally believe the type of accessing pattern used for paging stores is especially appropriate for bubble technology.

Although there is an initial latency time associated with locating the correct bubble domain under the read/write mechanism, subsequent serial access transfer rates can be as high as 3M byte/sec, according to industry experts.

Recent IBM research articles have described multiple levels of storage associated with a mainframe. It is believed the bubble paging device would be one of the levels in this hierarchy along with another device called the "back-end processor."

The latter device may well evolve from concepts used in the IBM 3850 mass storage

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Survey Finds Renters Pleased

Users Not Flustered by 158, 168 Cuts

By Molly Upton
Of the CW Staff

Users of IBM 370/158s and 168s were generally blase about the firm's recent price cuts on these CPUs and MOS memory [CW, April 4], a *Computerworld* survey found.

Very few respondents had systems on rental from IBM and could capitalize on the reduced purchase prices; most either owned their machines or were leasing from a third party.

But the reactions of the latter groups were not despair and anger; users appeared to be either happy, resigned or noncommittal.

Some of the users looked on the bright side as their machines' prices dropped overnight by lauding the move toward improved price/performance. "If this is a trend, we like it." Another likened the anticipated situation of vendor competitiveness to a "gasoline price war."

Others were resigned, saying IBM can do whatever it wants with prices.

Only the Beginning

David Hitt, manager of management information systems at Zale Corp. in Dallas, said the price cuts were probably only the beginning of what's going to happen this year.

Hitt was impressed by Amdahl Corp.'s reaction — that mainframer announced price cuts of its own 72 hours after IBM — and said he is pleased to see Amdahl venturing into the smaller machine area, namely the gap between the 158 and 168.

Zale, a large jewelry retail chain, owns its two 158s. Hitt said the firm can always use these in another of its DP centers until they are fully depreciated.

Rather than rushing to buy IBM memory at its lower prices, Hitt is waiting to assess the independents' reactions.

New York City's Social Services Department was one of the few users contacted that rents from IBM. A spokesman indicated the department was "pleasantly surprised" by IBM's moves and said he expects New York City to convert its two 158s to purchase.

The State University of New York, which had previously rented its 158 from IBM, converted to purchase three days after the announcement, according to Norman Quinn, manager of the DP center.

The university had been planning the purchase for some time, he added.

After the announcement, TWA in Kansas City bought two of its 168s and sold them to a third party from whom it is now leasing them.

A spokesman commented that IBM would never have made the price cuts without competition. "We're glad, it saved us quite a bit of money," he stated.

Users who own their machines were not particularly upset.

Glenn Fritsch, DP manager for the Auto Club of Michigan, said his reaction to the price reduction was "not very favorable." He likes the new announcement, but not the

(Continued on Page 4)

Aid to Postal Service Could Harm Carriers, Congressman Warns

By Edith Holmes
Of the CW Staff

WASHINGTON, D.C. — Any effort by Congress to "protect" the U.S. Postal Service from the competitive effects of electronic funds transfer (EFT) or electronic mail could cause "grave harm" to the nation's domestic telecommunications industry, Rep. Lionel Van Deerlin (D-Calif.) said here recently.

Chairman of the House Subcommittee on Communications, which has announced its intention to rewrite the Communications Act of 1934, Van Deerlin appeared before the House Post Office and Civil Service Committee to urge that interested parties in Congress work together "to forge an information transmission policy for the last decades of the 20th century."

Many current carrier offerings — includ-

(Continued on Page 4)

Five DP Directors in Two Years Bite the New Mexico Dust

By Ann Dooley
Of the CW Staff

SANTA FE, N.M. — The State Department of Automated Data Processing here has run through five directors in the past two years because of a "helter-skelter" management policy and a lack of any management understanding from the present administration, according to sources.

The most recent resignation was that of director Gerald Gingras, who quit after three months on the job because he was ordered to hire a state legislator's son for the post of deputy director.

Gingras said he resigned because he could not manage effectively if he did not have the authority to hire whom he wanted. "I was hired to take care of a serious problem in the department, but they handcuffed me in doing my job," he indicated.

The department has never had a management base and the administrators are just not aware of the magnitude of importance of DP, Gingras said. "Just hiring a chief doesn't solve a problem; it takes years to build a management base," he added.

Gingras, a Vermont computer management expert, was hired to resolve a number of problems in the department after a nationwide search which drew resumes from 327 candidates.

One of his first priorities was to find a deputy director to assist in his managerial plans. After recruiting for eight weeks, the state personnel office submitted three candidates to him, he said.

One of these was Johnny Taylor, former director of the state's Transportation Department, whom Gringas de-

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IBM Continues 'Clearance Sale' With Cuts on Four More Systems

(Continued from Page 1)

processors and 35% on main memory — the old "buy them while they last" pitch.

The 370/115 is the only unit that is in any type of new production and its status is that of "limited new production," IBM said last week. This means each unit shipped may either be new or reconditioned, but warranteed as new.

The other three units are classified as "not in new production," which means that every one of these units coming from IBM is reconditioned but warranteed as new.

On the 370/115-0, the purchase, lease and rental prices were $127,550, $3,150 and $3,460 respectively three weeks ago for a 98K unit.

After the memory price reduction, the prices were $125,650, $3,080 and $3,380 respectively, but these have now been dropped to $101,200, $2,490 and $2,730 for the unit.

On the 370/125-0, the three-week ago prices were $207,050, $5,075 and $5,580 for purchase, lease and rental respectively.

The first round of cuts reduced this to $205,150, $5,005 and $5,500 respectively and the new price slashes bring the unit down to a "rock-bottom" $164,800, $4,030 and $4,430 respectively for the 128K unit.

On a 370/135-0 unit with 256K of main memory, the old purchase price was $466,500 and the new price is $350,550. The lease price is steady at $8,870/mo and the rental runs $9,740/mo.

A 370/145-2 with 524K of main memory now costs $688,700, a "bargain basement" price tag compared with its previous ticket of $912,800. The lease rate is still $17,225/mo, however, and the rental remains at $18,960/mo.

Earnings Unhurt

ARMONK, N.Y. — While IBM is presently undergoing massive price slashing, its first-quarter earnings weren't impacted, with the firm reporting a record first quarter last week.

Revenues were $4.09 billion for the first three months of 1977, compared with $3.8 billion in 1976. Earnings were $573 million, up from $544 million in 1976 in the year-ago quarter.

The earnings per share were up almost 20 cents, from $3.63 a share to $3.82 a share.

Signs Point to New Generation of Mainframes

(Continued from Page 1)

system. The controller for the 3850 is known to have more capabilities than those utilized in the data cartridge system. Although not fully enabled, the controller can read the full DOS instruction set, according to experts.

Unlike the front-end processor, which handles data before it is entered into the CPU, the back-end processor would be an adjunct to the host. It would share storage and processing functions with the CPU; in data base applications, it would store portions of the data in associated direct-access peripheral subsystems.

The major function of the back-end processor would be to relieve the mainframe of accessing data and performing routine tasks. It could also act as a control device to supervise direct-access subsystem operations.

A back-end processor would require a controller with the capability of interpreting a full-scale operating system if it were to segment or offload major data base segments from the main processor.

Another element of the new family will be similar to the 3033 processor, introduced as an upgrade for the 370/168 [CW, April 4]. A second version of this type of processor is expected as an upgrade for the Model 158 during June, according to IBM watchers.

The 3033-type processor will form one of the storage levels in the new mainframes and could be the primary memory in the host CPU.

New Numbering Sequence

The mainframe series may have a 200 numbering sequence with the last two digits similar to those of the 370 family. Reportedly five machines will be included in the line. The 231 will replace the current models 115 and 125; the 241 will replace the models 138 and 148; the 258 and 268 will be one-for-one replacements for their 370 counterparts; and a top-of-the-line 278 will round out the series.

Fixed storage on the new series would range from 2M bytes on the 231 to 6M bytes on the 278; presumably the machines, at least on the high end, would be geared to large data base management operations. Additional storage could be attached in a hierarchical system.

The data base configurations would utilize a successor to the IBM IMS software that would implement the back-end processor concept. A back-end device would probably be tied in with a high-capacity storage subsystem, again to take some of the storage load away from the primary-level storage in the CPU.

It is expected that microcoded instruction sets would be used extensively and even selectively to make it difficult for users to attach plug-compatible devices. In this type of subsystem approach, the 3850 may again have provided clues.

In that mass storage system, the assignment of specific data to memory is completely supervised by the 3850 controller. Specific storage assignment algorithms may not be known to the user.

As a result, the system itself decides where data is stored; more importantly, however, only the system knows how data is retrieved.

This type of approach is a far cry from the interchangeable media such as that used on IBM tape and disk subsystems — an approach that attracted many plug-compatible alternatives from independent suppliers.

Whether all these concepts will be pulled together in the first models of the new series is still questionable. IBM will undoubtedly downplay the idea of the machines being a new generation, and the company will be correct because the concepts began appearing some time ago.

There may well be additional features in the new family. But following long-standing corporate policy, IBM is not talking about unannounced products under development or ready for introduction.

The exact system details may be modified, but there is little doubt that tomorrow's mainframes are coming closer.

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IBM Simplifies User Contracts by Consolidating Plans

By **Ronald A. Frank**
Of the CW Staff

ARMONK, N.Y. — IBM has consolidated its various customer contract agreements into four basic forms in a change described as purely administrative.

The changes were designed to make terms and conditions for IBM products and services "as consistent as possible with a simpler contract structure," IBM said.

Customers of the DP and General Systems Division will now have the following contracts from which to choose:

- Agreement for lease or rental of IBM machines.
- Agreement for purchase of IBM machines and agreement for purchase of installed IBM machines.
- Agreement for IBM licensed programs.

In addition, customers now operating under the Monthly Availability Charge (MAC) can continue to rent their equipment under the existing agreement for IBM machine service.

The MAC arrangement applies only to equipment introduced prior to April 4, but specifically excludes the 370/138, 148 and the recently announced 3033 CPU.

Customers that were operating under MAC can add additional equipment on the same basis from products introduced before April 4. New products can be installed under the equivalent of MAC using the new agreement for lease or rental.

No expiration date has been set to terminate existing MAC agreements, IBM said.

The agreements will be used for all new customers as well as new products, current customers leasing equipment for the first time and customers purchasing equipment or licensing program products, IBM said.

Current customers who wish to convert installed or on-order products to the agreements can do so at any time.

Although existing lease plans will be replaced by new contracts, the length of the leases and associated discounts compared to MAC will remain the same. Existing lease plans expire at various times up to April 3, 1983.

Added to the agreements are statements limiting the amount of IBM liability on certain products. The limits are $100,000 on lease or rental equipment or 12 monthly charges, whichever is larger; $100,000 on purchased equipment or the purchase price, whichever is larger; $50,000 on maintenance agreements; and $25,000 on software or any charges due for 12-month use of the program, whichever is larger.

Purchase option credits in effect previously are unchanged and leased I/O products get expanded price protection under certain conditions with the new contracts.

System 34 Comes Unbundled

(Continued from Page 1)

tions previously found in such systems since some have been incorporated in microcode. However, the system will not work without the SSP unless a user writes an equivalent for it, IBM said.

The operating system instructions now found in microcode include task management, storage management and I/O control functions, IBM said, adding the SSP is, however, "basically the operating system" for the 34.

The 34 also features IBM's Model 5340 system unit, which supports one-sided or double-sided floppy diskettes, and the newly introduced Model 5251 display system.

Designed for both small business and distributed processing users, the 34 seems certain to be the successor to IBM's popular System 32 small business system.

The 34 is compatible with the 32 and, "with minor modifications, System 32 programs will run on it in single-program mode," IBM said.

In addition, IBM said 10 of the Industry Application Programs available with the 32 will also be available with the 34.

A basic System 34 configuration includes a CPU with 32K of memory, 8.6M bytes of disk and a single-sided disk drive. Memory can be expanded to 64K and up to eight display stations or table-top printers can be accommodated.

Both a display station used as a system console and a printer must be added to the basic configuration at extra cost.

The 5340 CPU performs both arithmetic and logic functions and microprocessors are used to control I/O devices. The 5340 also contains the floppy drive, disk storage and a workstation controller.

Nonremovable disk storage ranges from 8.6M bytes to 27.1M bytes. Average access-time is 40 msec, IBM said.

The Model 5251 display station also introduced with the 34 consists of 1,920 char. in 24 lines of 80 char. each. A display may be connected within 20 feet of the CPU to serve as the system console and additional displays may be attached at distances of up to 5,000 feet from the CPU, IBM said.

The 5256 printer is a bidirectional matrix printer providing speeds from 40- to 120-char./sec and can be used in conjunction with the display station.

Also introduced was the 5211 printer, a stand-alone, separately powered line printer attached to the CPU via cable. Only one may be attached, IBM said, adding it is available in either 160 line/min or 300 line/min models.

The system supports both Synchronous Data Link Control and Binary Synchronous Communications and can communicate with the System 3, 32, other 34 and larger IBM mainframes.

The System 34 SSP is said to provide System 32 compatibility while supporting work stations and multiprogramming.

System 34 RPG-II is the main programming language, but Assembler language is also available to users, the firm said.

A basic System 34 will lease for $950/mo on a three year lease and can be purchased for $34,700. Deliveries will begin in January.

A 5340 CPU with 32K of memory, single-sided disk drive and 8.6M bytes of storage costs $26,300, rents for $786/mo and leases for $716/mo.

The largest model with 64K, double-sided disk drive and 27.1M bytes of disk storage costs $40,820, rents for $1,237/mo and leases for $1,125/mo, IBM said.

The 5211 printer attachment costs $1,440, rents for $44/mo and leases for $40/mo; the 5251 display station costs $3,200, rents for $100/mo and leases for $85/mo. The 5211 printer at 160 line/min costs $12,800, rents for $376/mo and leases for $320/mo.

In addition to the monthly charge for the SSP, RPG-II costs $25/mo and Assembler costs $75/mo.

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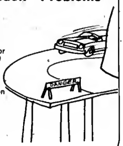

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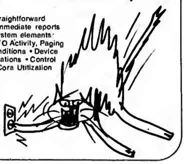

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Aid to Post Office Seen Harming Carriers

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ing TWX/Telex, Dataphone, the Transaction Network Service (TNS) and all the services of Graphnet, Telenet and Tymnet — would collide with any extension of the private express statutes that might be designed to help the post office stave off competition from developments in electronics, Van Deerlin noted.

Such "protection" of the Postal Service would also greatly restrict the right of consumers to use telecommunications facilities as they see fit, the congressman stated.

Same Function

The common carriers and the post office provide the same function — they move information, he continued. But "it appears today that modern telecommunications and computer technology may provide a superior alternative for carrying much of the information which currently flows in the mails," he added.

"The dramatic growth in telecommunications and computer technology today poses two fundamental policy problems for the Postal Service and this committee: the problems of transition and interconnection," Van Deerlin said.

Rapid developments in electronics and their attendant reductions in costs will assist in creating electronic message services. And if electronic telecommunications become cheaper and easier to use than the mail, more and more mail traffic will be "diverted" to electronic message systems, the congressman predicted.

He believes increased postal subsidies may provide the most efficient and fairest transition period. Under no circumstances should Congress abandon the postal workers, Van Deerlin added.

Second Policy Problem

Interconnecting electronic telecommunication services and the Postal Service is the second major policy problem facing the House committee, Van Deerlin stated.

The Mailgram currently provides a simple but efficient form of interconnection between Western Union's electronic telecommunications network and the Postal Service's physical distribution network, he noted. The congressman suggested the potential for expanding arrangements like Mailgram be carefully examined by the committee.

Crucial Questions

WASHINGTON, D.C. — Before any decisions are made on the future of the Postal Service and how it will coexist with electronic forms of communication, according to Rep. Lionel Van Deerlin (D-Calif.), the following questions should be answered:

- Should the Postal Service be required to offer interconnection to all communications carriers on a standard basis?
- Should the Postal Service be permitted or required to accept messages for transfer to the carriers?
- Should Congress authorize the Postal Service to offer "value-added" communication services in order to operate as a resale carrier?
- Should the private express statutes be relaxed in order to harmonize the roles of all information carriers?

Users Unflustered by Price Cuts

(Continued from Page 1)

price cuts. The auto club owns a 158 and a 168; each is about a year old.

The price reductions may cause the auto club to keep the machines longer than it had anticipated, he speculated.

Jack Lutz, director of corporate finance administration for GTE Sylvania in Camillus, N.Y., had no reaction to the price cuts. "That's IBM's business," he stated. As long as the firm's purchased 158 meets its requirements, GTE will keep it, he said.

Steve Nelson, teleprocessing supervisor for Kemper Insurance Group, Lake Zurich, Ill., noted upper management is a bit concerned over the effect of the price cuts since Kemper has a multiprocessor 168 configuration. But the firm is resigned to the fact IBM can do whatever it wants, he said.

A happy user is Charles Little, director of the DP center for Ohio State University Hospitals. "We're just overjoyed," he stated. "The new core is cheap, so we can expand."

Little was not overly upset by the mainframe price cuts. The hospital DP center has owned its 158 for a couple of years and plans to keep it for a total of at least five.

"We'll amortize it, and with depreciation it will be zero on the books at the end of the five years," he said. "We didn't buy it to resell it."

Frank J. Martin, chief of systems and programming for Bethlehem Steel Corp. in Lackawanna, N.Y., said his reaction was "very positive."

The announcement was not just a reduction in price, but also improved performance, he said, referring to the IBM 3033 processor announced at the same time as the price cuts.

Otto Sponholz, computer operations manager for Guardian Life Insurance in New York City, said the firm bought its 158 about a year and a half ago.

"It's too bad we didn't wait. If we had known, we might have rented," he said, but added the firm couldn't have delayed installing a 158.

Reactions also varied among users who lease their machines from third parties.

Paul Fulton, director of DP services for the Columbia Gas System Service Corp., Columbus, Ohio, was enthusiastic about the 3033 processor. "I think it's good the way we're heading. I assume we'd like one large machine" in order to cut operational costs, he said.

Although unaffected by the price cuts because of the leases, which are four and two years on his 158s, Fulton's lessor did guarantee some of the system's residual value.

But when making the agreement, the firm knew the value at the end of term might not be as great as that for which it was assuming responsibilty, he said.

Al Leiker, director of systems programming for Far-Mar-Co. in Hutchinson, Kan., commented that IBM is always "promoting long-range planning, but is the first one to screw up that long-range planning."

He is "damned glad" he doesn't own his 168 and has quick exit options written into his eight-year, third-party lease contract.

Leiker feels he came out ahead because he sold a 158 before getting the 168.

Its 158 is in its third year of an eight-year lease, he said. The lessor guarantees the system's residual value only if Gates terminates its lease early. That is not likely since Gates is thinking of going to an attached processor, he said.

David Laidlaw, director of systems at Northeast Utilities Systems, Wethersfield, Conn., said he "was not surprised. I knew better price/performance CPUs were coming down the pike."

Although its 158 and 168 are on third-party leases, the service company for utilities will probably be able to cost-justify a new machine, such as the 3033, along with the 168 in a few years, he said.

The firm leases its 158 on very favorable terms and can probably sublease it, he said, but it won't be economical to get rid of its 168.

"I'd much rather be in a position of monthly rental," Laidlaw commented.

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Help Wanted: New Mexico Needs Another DP Director

(Continued from Page 1)

cided to hire."

Gerald Mora, the state legislator's 30-year-old son, did not have sufficient work experience to qualify for the position description, so his application was not sent to Gingras by the personnel office, he indicated.

After submitting Taylor's name to Vince Montoya, state finance director, Gingras was told his choice was unacceptable and Mora would be hired.

When it became apparent that no negotiation was possible, Gingras said he submitted his resignation.

The incident has received considerable attention from the state's newspapers. When the controversy became known, Mora withdrew his name for the position, saying he did not want it "if it means getting special consideration."

Hiring Policy

The reasons for the order to hire Mora are complex. Apart from the obvious political connection, Mora is Mexican-American and Gov. Jerry Apodoca's administration policy is to have "a balance of Spanish-surnamed and Anglos in high positions of state government," according to the *Albuquerque Journal*.

While Apodoca is generally well liked by voters, sources indicated a number of decisions have been made for reasons of political expediency during his first two years in office.

Perhaps such impulses are encouraged by New Mexico law, which limits a governor to one four-year term, a source suggested, pointing out governors must plan for their futures.

Montoya denied that Mora would have been hired for his political connections. "I've never settled for a political hack in any of my decisions — none," he said.

"Mora is a good man with a great deal of potential and would have grown into the position. We feel he is more qualified than Taylor, which is why we wanted to hire him," he added.

"I'm sorry that it's a typical bureaucratic approach. Anytime these professionals can't get their way 100%, they cry 'politics,' " Apodoca said.

"Gingras had forgotten that he had two bosses — myself and Montoya. A director can't have his way all the time," he added.

The primary reasons for the state of the DP department are the tremendous growth that has occurred in recent years, poor salaries for DP employees and no management, Gingras said.

As for the present situation, Montoya and Abodoca "wanted their own way in the end which is their perogative; they could do as they wished," Gingras said.

"They have so many things on their minds, they aren't aware of the significance and the role DP is playing in state government," he continued. "They really didn't give me a chance to help them.

Technically, the DP department is moving along reasonably well, he said. It has good computer people, but no management and no long range planning, he added. There is no billing, training or standards and there is some rivalry between departments — all of which could be regulated by firm management guidelines, he said.

Most serious of all is the lack of planned security, Gingras said. The centralized system in New Mexico "is ripe" for breaches in security because the computers aren't secure, he noted.

Gingras had already begun to institute key locks on machines, implement masks and hard-wire the terminals.

New Mexico is currently conducting a statewide search for a replacement for Gingras, but one observer said "it will have to be someone from out of state who doesn't know the situation or a political hack."

Condensed NBS Report On Privacy Available

WASHINGTON, D.C. — The Commerce Department's National Bureau of Standards (NBS) has published a condensation of its privacy study, *Computers, Health Records and Citizen Rights*, that was released in January.

The condensation, *A Policy Analysis of Citizen Rights Issues in Health Data Systems*, is catalog number C13.44:157.

It costs $1.05 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correction

A headline in the April 11 issue indicated the Itel AS/5 was equal to an IBM 370/155 in user tests. However, as the story noted, the AS/5 performed equal to or better than an IBM 370/158 in the tests run by Pacific Mutual Life Insurance Co.

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The Issue of 'Professionalism'

The enforcement of codes of ethical conduct within DP professional societies in some instances raises the issue of "professionalism."

The Institute for the Certification of Computer Professionals (ICCP) and the Society of Certified Data Processors (SCDP) feel professionalism within DP is necessary before codes of ethical conduct can be enforced.

But they differ on how to arrive at the professional status which will permit a self-policing profession, according to the groups' president, Gary Casper.

The ICCP's position is that licensing or legal definitions of the profession are premature because the profession hasn't been defined per se, Casper explained. The current role of the ICCP is to define voluntary certifications leading to professional activity, he said.

The ICCP is "trying to get enough practitioners and managers to feel good about the credentials so they will create peer pressure and thus create a profession, he said.

Certification is the seed leading to the focus on professionalism, Casper said.

The SCDP, however, feels a legal definition is needed before the profession can become legitimate, just as the Securities and Exchange Commission (SEC) put teeth into the Certified Public Accountant (CPA) certificate.

"This is a very rapidly emerging profession, and the issue is: 'How much time do we have?' " Casper said.

The alternative to DP becoming a profession is that it will be a technician class, with DPers governed principally by codes applying to the professions in which they are employed, he suggested.

One source of impetus may come from malpractice suits, which could lead legislatures to enact laws or DPers to push for laws, he observed. Practitioners in new areas need the protection of codes or standards as defense in malpractice suits, he said.

DP Organizations Found Hedging On Enforcement of Ethics Codes

By Molly Upton
Of the CW Staff

While all professional DP societies boast codes of ethics, there have been few if any instances of punishment for society members who have violated those codes, a *Computerworld* survey has found.

One stumbling block to code enforcement seems to be the fear of legal reprisal, one spokesman explained. As a result, it is difficult to judge whether the standard punishment — expulsion from a particular organization or revocation of a certificate — is an effective means of ensuring the caliber of conduct among DPers.

Another reason for the lack of enforcement of the codes could be a Catch-22 quandary embedded in the act of enforcement. Organizations classified as tax-exempt scientific-educational groups may be in danger of losing their tax exempt status if they are perceived to be too active in efforts such as lobbying or enforcing codes, according to sources.

They would then be classified as "professional" groups, the sources indicated.

No ICCP Enforcement

The Institute for the Certification of Computer Professionals (ICCP) was established as an umbrella organization to provide standards for certification of DPers, according to Gary Casper, who is president of the ICCP as well as the Society of Certified Data Processors (SCDP).

Ultimately, the ICCP's various member organizations may delegate to the ICCP the responsibility to administer and enforce a code of ethics, but that has not yet happened, he indicated.

Casper said he doesn't know of a single instance of expulsion or revocation of membership within the two organizations. "People have raised the issue, but no one has been willing to take the risk and enforce it," he said.

Spokesmen from several other societies indicated a reluctance to reprimand someone or even consider the issue unless the accused had been convicted in a court of law.

"To act prior to a court verdict could be interpreted as smearing someone's character, and the organization could be held liable," according to Robert J. Marrigan, president of the Data Processing Management Association (DPMA).

While Merrigan advocates enforcement of ethical codes, "with malpractice suits and the way people think, it's a difficult thing to tackle.

Cases with "hard and fast evidence on both sides of the coin" have been brought to the DPMA, he added.

There are no bylaws for DPMA International for handling disciplinary procedures; such matters are up to the the local chapters, another DPMA spokesman said.

Actions of Acps

Unlike Marrigan, Robert White, vice-chairman of the board of directors of the Association of Computer Programmers and Analysts (Acpa), does not believe an organization should refrain from reprimands until after court action for fear of being liable.

"There are remote challenges of ethics and codes of conduct, and when these aren't confronted, people say there's nothing they can do. But you have to confront it," he remarked, adding a breach of ethical conduct often does not constitute violation of a law.

White is attempting to organize a meeting of programmers and analysts from both the public and private sectors to discuss what "we as a professional community can do to avoid government intervention and if we can regulate ourselves.

"If we as a professional community cannot somehow effect this control and professional attitude in ethics . . . then it will be legislated," he said, adding there are bills pending in about 18 states that would regulate DPers through licensing or certification.

Acpa has a procedure by which members may be reprimanded, but here, too, no one has ever been brought up on charges of violation of the ethics code, White said.

The ICCP has one of the most explicit procedures for handling alleged violations — it reserves the right to revoke the Certificate in Data Processing (CDP) when a holder "violates the codes or engages in conduct which is a discredit or disgrace to the DP profession."

The grounds for revocation are based upon the opinion of at least a two-thirds majority of the members of the ICCP council, according to the group's handbook.

The procedure for handling revocation includes written statements of charges and a hearing. In addition, the accused has the right to request review of the council's decision by the ICCP executive committee.

The Association for Computing Machinery (ACM), however, has yet to adopt procedures other than specifying that infringements should be brought before its executive council. Here a three-fourths vote is necessary for expulsion.

No case has been brought on the grounds of the ethics code, probably because of the lack of a mechanism, George Dodd, secretary, observed.

Within ACM, the Professional Standards and Practices Committee has recommended the council "adopt a set of procedures which will afford practical due process if a disciplinary situation arises," according to a report prepared by committee chairman Oliver Smoot.

However, ACM's Long-Range Planning Committee (LRPC) has recommended the council either eliminate the "enforce" concept from its constitution or "establish a mechanism to seek out violators of the code of ethics and develop procedures with respect to enforcement which satisfies the implied commitment" of the code.

"The slow action with regard to enforcement contravenes the spirit if not the letter of " the code, the LRPC said.

The provision states "the council shall adopt, maintain, enforce and conspicuously publish and display to all members and the public a code of professional ethics which shall be binding on all members of the association."

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Interindustry Cooperation Crucial

Standardization Called Key to Widespread Use of EFT

By Toni Wiseman
Of the CW Staff

NEW YORK — Widespread use of electronic funds transfer (EFT) systems will remain only a vision unless there is an increase in interindustry cooperation.

This was the opinion expressed here recently by George C. White Jr., vice-president of the Chase Manhattan Bank N.A., who mentioned development of the Universal Product Code by grocers and scannable optical character recognition merchandise tags by retailers as examples of effective cooperative standardization efforts.

"Standardization in the payment mechanism, as in practically all industrial efforts, is the key that enables corporations to interface with others," he told an audience at the Bank Administration Institute's (BAI) Conference on Corporate-to-Corporate EFT Systems.

"As the value or cost of manual clerical effort has continued to escalate, the motivation to standardize has increased. While standardization within a single corporation offers some value in efficiency, it is the interfacing with other systems that makes its products and services even more valuable," he said.

"Cooperation is required for standardization of the payment infrastructure," White stressed. "Competition, on the other hand, occurs in the offering of products using the standardized infrastructure."

Lack of Foresight

So far the most significant development affecting the payment infrastructure was the adoption of magnetic ink character recognition (Micr) in the late 1950s, White said.

By the middle of the 1960s, Micr had become the accepted standard for check processing, and by 1968 the Federal Reserve System required that all checks it processed be standardized with the eight-digit drawee bank routing and transit numbers.

Banks began to install computers for Micr check processing and the power of computerization led many banks to customize services to the requirements of their corporate customers, White said.

Bankers, however, did not generally work together to standardize common product reporting requirements. As a result, national corporations using more than one bank for such things as checking account reconcilement services and remittance processing through lock boxes, specified their data input requirements.

"While it is easy with our perfect hindsight to say that those of us in banking should have developed industry standards for common products, we did not have the foresight to do this — probably because of our captivation with the tremendous capabilities of computers," White said.

To install standards later becomes extremely difficult because significant changes are required on the part of many participants.

"While many are willing to use an industry standard, the often-heard proviso is that the standard generally must be what the organization already has installed," the Chase executive stated.

Several standardization efforts attempted during the 1960s met with only limited success since, as is often the case in standardization efforts, benefits and interest varied from user to user. Examples of these efforts were lock box transmission standards, invoice standards and statement standardization, he said.

Two Types of Networks

Two types of EFT networks currently exist: those for high-value/low-volume single messages, such as the Fed Wire, Bank Wire, the Clearing House Interbank Payments System (Chips) in New York City and the Society for Worldwide Interbank Financial Telecommunications (Swift); and those for low-value/high-volume batched messages such as the 28 automated clearinghouses now in operation.

"The point to constantly keep in mind as we think about corporate payments in the future is that we should be primarily concerned with the data needed to complete a financial transaction rather than be concerned with the technical way of transmitting a financial transaction," White said.

"The financial networks simply offer the means to carry out transactions, but in no way in themselves cause payments to be handled electronically."

In the last few years banks have also developed specialized interfaces to communicate with their corporate customers rather than being dependent on telephone or written instruction, he noted.

Looking to the 1980s, White predicted the continuing cost escalation of systems based on physical movement (i.e., postal services and checks) will cause the present payment mechanism to change.)

In effect, corporate payment data output will be prepared within interindustry standards for automated input to the financial infrastructure, he forecast. The interindustry standards would enable financial reporting and analyses not previously feasible or economical.

For example, electronic transmission of billing data within the financial infrastructure for subsequent electronic payment initiation by the recipient would replace the mailing of invoices and statements, he said.

Koch Set to Keynote Data Base Conference

NEW YORK — Rep. Edward I. Koch (D-N.Y.), an early sponsor of federal privacy laws and a member of the Privacy Protection Study Commission, will speak at the Association for Computing Machinery's (ACM) regional conference on data bases here on May 23-24.

Koch will speak on why privacy protection is needed in the private sector.

The conference, entitled "Data Base: The Practical Issues," will be held at the Biltmore Hotel. It will feature special vendor presentations on available data base packages from the major software vendors.

More information is available from Jim Adams at ACM headquarters, 1133 Ave. of the Americas, New York, N.Y. 10036.

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Loss of Float in EFT Systems Seen Both Benefit, Disadvantage

By Toni Wiseman
Of the CW Staff

NEW YORK — The loss of float has been a key issue hrought up by opponents of electronic fund transfer (EFT) systems, but there are two sides to the story, according to Wayne Lewin.

Lewin, vice-president and director of industry systems of the Bank Administration Institute (BAI) told attendees of a BAI conference here recently that banks and corporations must also acknowledge thay are giving something up — control — in order to take advantage of float today.

"Usually when the question of float comes up, everything else pales, and this should not be the case," Lewin stated.

Float — the amount of funds represented by outstanding checks and checks in the process of collection — is a relative thing based on current financial practices, but there are many downstream implications of taking advantage of float, he said.

"At least $20 billion a day of float is generated at any pont in time through husiness-to-business transactions, but we must realize this is an industry-specific thing, a spectrum-type question, which can't be viewed in a vacuum," Lewin said.

On the national level, it has been recognized that float Is not a right that corporations and banks have, he pointed out, noting the National Commission on EFT stated in its interim report that float is a characteristic of the current payment system and the marketplace should determine how it will he used.

The commission had initally termed float an "anachronism" of the system, but changed the wording in the final version of the report, he noted.

Vendor Loses Control

Lewin described the collection and payment processes as they are currently transacted, based on a paper system. In at least three of the five steps, the vendor has no control, he said.

A vendor has a fair amount of control over invoicing, although keypunch errors can occur. But the bill then enters the mail system and he loses control.

Payables processing depends on the terms established with the customer, but again control is difficult since the customer must mail the payment back. This means the vendor really has no truly accurate knowledge of when payment will come in, even though he can forecast with fair accuracy when those funds will become available to him.

"One of the big advantages of automated systems, of corporate-to-corporate EFT systems, is the predictability and control they will bring," Lewin told the audience of bankers and corporate executives.

"In order to take advantage of float, or the 'collect by wire and pay by mule' theory, you have to surrender control of some points in the system," he said.

Some of these include control over processing expense, privacy and security, reliability and management information, he stated.

A BAI study found most banks which did use wire transfers transferred about 25% of their assets in and out over that wire every day. "And it is appalling to see the lack of security which is allowed in the system," Lewin added.

Finally, the current payment system requires users to surrender the ability to gather management information and use it in a timely fashion.

FCRA Bibliography Offered

OAKLAND, Calif. — An annotated bibliography of the Fair Credit Reporting Act (FCRA) has been compiled and published hy Michael J. Barkley, a certified public accountant and law student here.

It contains the existing statutes and regulations as well as a compilation of those pending.

The 124-page report is available from Barkley at No. 12, 2531 E. 16th St., Oakland, Calif. 94691.

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TRANSNET CORP.

The Waves of Change

By Charles P. Lecht

With this installment, Computerworld, *begins excerpting* The Waves of Change, *a soon-to-be-published book by Charles P. Lecht, president of Advanced Computer Techniques Corp. Lecht will explore the present structure of the computer industry and computer use and make predictions for the future based upon the current scene.*

PREFACE

This book is about the computer industry. Its purpose is to present an envelope of facts which are necessary (if not alone completely sufficient) to understand the changes taking place within that industry: in its technology, politics, psychology and economics.

Of course, the book's point of view cannot help but reflect the provenance of its constituent data fragments; the reader must be mindful that these have been processed, organized and dispatched by "computer people" who suffer from being caught up in the envelope which they essay, I believe honestly, to describe.

With little further fanfare, therefore, I acknowledge that *Waves of Change*, even at its inception, is necessarily biased because of this. But all bias isn't bad, and some bias can occasionally be more illuminating, in its fashion, than none at all.

Furthermore, I do not pretend that the facts, analyses and conclusions presented in this book are of necessity always correct. This, hopefully, is the case, less because too little research was performed than because of the inherent nature of some computer field ideas.

Our arguments about things seem much more related to differences in philosophy than they are to "simple" facts of engineering. At times, our words seem to serve as mere football signals, invoking abstract plays of great and sometimes unrecognized complexity.

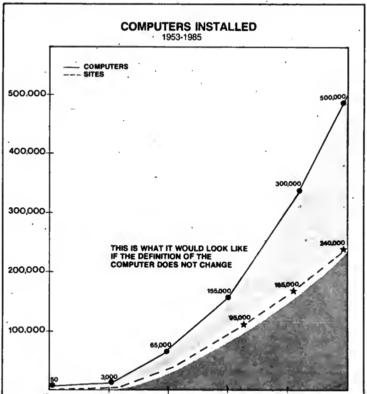
At other times, we acknowledge that the common understanding of an idea shared by various computer people may be woefully circumscribed, but we forge ahead, using it anyway just to get on with it, hoping for better days.

For example, in Figure 1-2, I present the numbers of computer systems shipped over the years, as though the meaning of computer system as known to everyone in the 1950s, 1960s and 1970s is the same. Is the HP 225 a computer system? With increasing intelligence being incorporated in previously purely electromechanical devices, e.g., the intelligent disk, the somewhat rigid concept of a computer system that would have been familiar to and unquestioned by the 1950s computer person is the dull and largely remote (in time and practical relevance) antecedent of today's seemingly nonstructured and boundless, fluid concept.

We used to talk of management information systems as though everyone's notion of what they are was identical. Now we have distributed processing with which to contend. And, to our horror, the "computer system" concept (bad enough, as I said earlier) and the "communications system" concept are racing headlong toward each other, perhaps to culminate in some weird, Godzilla-meets-King-Kong, corporate showdown between IBM and Ma Bell.

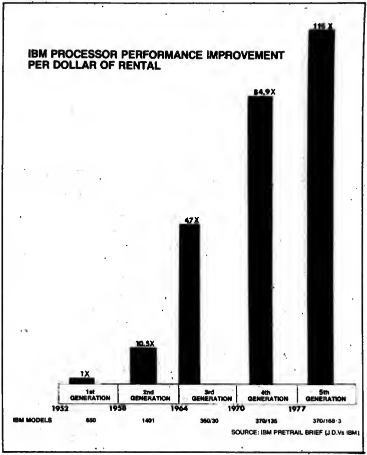
Anyway, I mention all of this because I wish, at the onset, to lay to its long-deserved rest the notion of complete certitude in certain key issues in this work. Let the experts and charlatans sustain it with their verbal respirators, if they must. If a concept bearing on an issue under discussion seems vague to the reader, it is probably equally vague to me. Hopefully, we will always be fundamentally "in synch."

If facts are the message, organization might be considered their envelope. But points of view — historical, conspiratorial, etc. — require participation of both author and reader through a melding of their predispositions to see things in a certain way with respect to other things.



SOURCE A C T ESTIMATES

Figure 1-2



SOURCE: IBM PRETRAIL BRIEF (J D.Vs IBM)

Figure 1-1

Thus, when an opinion or analysis is given, it derives from the way I and/or other computer people see it. If any one conclusion is unpleasant to one reader or another, be assured that the provocation is unintentional.

Finally, I am indebted to Gideon Gartner of Oppenheimer and Co. for making his extensive files on the computer industry available to me and to Robert Fertig for organizing much of the information. Carl Menkel, ACT's manager of documentation, edited the text, doing the best he could with the kind of stuff he had to start with, all things considered.

CHAPTER I

From at least one perspective, the computer industry may be thought of as driven by economics and politics — to the dismay of technologists. Many inventions will never see the light of day because of self-impact issues (the replacement of an existing, partly or fully depreciated product with a new, lower priced, higher performance, nondepreciated and lower net revenue device or system).

Many computer-related developments are not funded even though they may represent the "best" user or market solutions or most cost-effective offerings possible; rather, numerous projects are funded and may eventually lead to the introduction of products, because high-level corporate, political forces have a vested interest in the project.

Product development is often the neurotic offspring of the Muse of Political Compromise, on the one hand, and a company's contending right and left wing forces, on the other. Frequently, this gives rise to an environment wherein low risk is more highly prized than innovation or performance, time schedules are more sacred than ultimate product stability or reliability and the achievement of immediate cost goals is seen as more vital than long-range maintainability or human factors.

Yes, some technological capability and creativity is essential, but not too much. Was IBM's 370 a major architectural and technological improvement over 360? IBM and many other manufacturers appear basically conservative; i.e., they will not take any unnecessary risks in order to create what the user population may really need.

Why upset a core memory manufacturing process just because someone invented integrated circuit memory (or switch from small-scale to large-scale integration)? Does it make good business sense to render tens of thousands of magnetic tape drives obsolete, thereby losing hard-won rental revenues on already depreciated equipment, just because some genius in the lab invented a nonmechanical, faster, lower cost and more reliable device?

Whatever. the situation, no one would argue with the notion that a viable computer industry requires a proper balancing of technology, politics, psychology and finance, with the latter most often on the critical path.

Evolution of Complexity

The 1950s and early 1960s was a time of small, simple, free-standing independent computers during which individual users could use the "machine": a one-on-one basis. Programmers were also operators, and direct testing and debugging from the console was a common practice.

Applications became more complex; and standard interfaces, controls and so-called "higher level languages" (Cobol, Fortran, PL/I, etc.) became commonplace in the mid-'60s. Batch processing and multiprogramming methods were employed to optimize the "machine." Operating systems software evolved, and operators and other specialists came between the "end users" and the "machine." Small computers grew up and became medium-scale systems.

Technological hardware improvements were introduced at a phenomenal rate in the early '70s. In 1969 many people hoped for a lessening of the pace of technological change of the 1960s, in the environments that created it and the products which reflected it. As we entered the 1960s, many, if not all, saw the converse take place in both cases . . . much to their dismay. And, in the later 1970s, very few people, if any, foresaw with reasonable accuracy the evolutionary path of companies and products and the impact of these and other phenomena on

(Continued on Page 10)

The Waves

(Continued from Page 9)

the world technological scene.

Economies of Scale

The cost of computation, memory and input/output devices decreased at an accelerated rate (see Figures 1-1 and 1-3). The economy-of-scale, or Grosch's Law, factor encouraged consolidation of applications and data bases into fewer large-scale, centralized systems with elaborate multiprogramming and resource-sharing schemes to optimize the use of the "hardware."

By the mid-1970s, end-users were far removed from the computer room, and many data processing departments were too busy supporting and maintaining current, but old, applications. Many, bogged down this way, became totally unresponsive to user needs.

New application developments became a bottleneck; maintenance of the old applications absorbed most of the available resources. Complex real-time or transaction-oriented applications evolved, but many DP departments, burdened with running day-to-day tactical business applications, were unable to support and/or capitalize upon the growing data base/data communications trend.

In some cases, data processing organizations seemed to become ends in themselves, to the dismay of the organization which created them.

Full Circle

By 1980, we will have come *full* circle, back to the concept of a "computer for every user" — a one-on-one situation. Intelligent terminals and distributed networks of computers will do much to dispel the frustration experienced by end users confronting the arcane inflexibility of today's complex systems.

Computer system cost-performance (Mips, cycle times, data rates, etc.) will play a less prominent role, and "people-performance" — efficiency, responsiveness, ease of use, maintainability — will advance to the forefront in the computer system selection process.

End-user (doctor, lawyer, engineer, librarian, student, etc.) languages, problem-oriented languages and application generators will be developed such that the need for additional computer specialists can be significantly limited or reduced.

The distributed processing network era will have arrived, and "people-performance" will be its reason for being. The IBM Share/Guide finding of 1976 that computer industry growth is limited most severely by lack of intelligence in the user community will be well on the way to being overcome by packing more intelligence into the computer system and distributing it more effectively within the oganization it serves.

Enhanced Cost Effectiveness

During this inflationary period of rising prices and escalating costs, the data processing industry has been a leader in giving customers and end users higher performance products at *lower prices.* This has enabled other industries to improve the efficiency of their production and service, to reduce waste and to minimize the need — if not the desire — for increasing their own prices.

In fact, the emphasis upon technological innovation, the commitment to refinement of product concepts and performance which have characterized the DP industry throughout the past 25 years have engendered *at least* four generations of product families within that relatively modest timeframe.

Furthermore, the concomitant achievement of enhanced levels of cost effectiveness has been so dramatic that, for example, the cost of performing 100,000 computations has fallen from approximately $1.26 in 1952 to roughly 5 cents in 1970 and about 1 cent in 1974. By 1977, this incredible improvement in cost performance is expected to approach .5 cent per 100,000 computations.

Figure 1-1 presents IBM processor performance improvement per rental dollar over time, which is another way of demonstrating the dynamic progress of processor technology.

Prerequisites for Survival

In our industry, the companies that will survive and grow are those that recognize and act upon the imperative to serve the interests of their customers as well as themselves and to direct the full energy of their professional staffs to the pursuit of this dual aim. Prosperity, not to say survival, in our business will come solely to those well-managed, functionally integrated firms which are perceptive of and organized to respond rapidly to customer requirements.

In the 1960s, huge corporations such as General Electric, RCA, Xerox and Singer, which had substantial interests in other areas, failed to make the commitment necessary for success in the computer industry. As a result, we find General Electric's computer division merged into Honeywell's operations, RCA's computer division absorbed by Sperry Univac, Singer partly acquired by International Computers Ltd. and TRW, and Xerox dropping out of the computer business (its customer base being maintained by Honeywell). This represents a consolidation of many computer manufacturing firms into fewer, more viable enterprises.

Some new participants should also be noted: Itel, Amdahl, Texas Instruments and various microcomputer firms.

Some *possible* future combinations include: Burroughs and ICL, Univac and NCR or Siemens, Fujitsu/Hitachi and Control Data Corp. More acquisitions, mergers or joint ventures are likely in order to achieve the economy of scale (assumed to be about 10% market share) required to survive.

One of the real possibilities for the late 1970s is that AT&T, which in 1954 made the first transistorized, general-purpose digital computer, may actually enter the "data processing" market. AT&T, with 1975 revenues of approximately $29 billion (twice IBM's 1975 revenues), and drawing upon the considerable resources of Bell Labs and Western Electric, could be a very significant entrant in this industry.

However, in the pre-1976 period we can find many firms which, while they in fact had the resources to compete in the computer industry, nevertheless were unwilling to make the research and development or financial investments necessary to participate effectively.

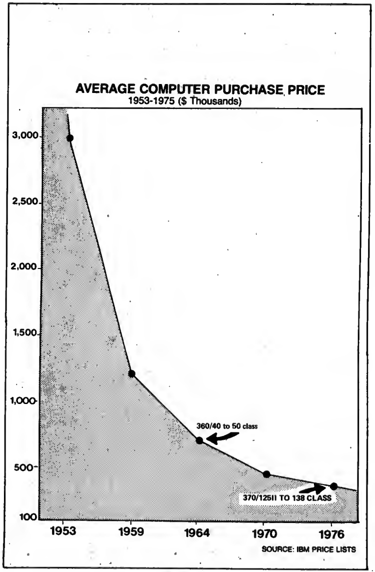
'Thinking' Computers

This past year was the 200th anniversary of the independence of the United States of America; the first "general-purpose" computer was installed by the Bureau of Census in 1951. Twenty-five years may not be an enormously long period in the perspective of the slow but ever-accelerating evolution of modern technology (or nationhood), but it is a long time in the life of an individual, corresponding almost exactly to the time he or she requires to reach maturity, enter the job market or reach at least the middle echelons of business and government.

A whole generation of Americans has thus passed through these phases within a computer-oriented environment. The psychological impact has been enormous: we "think" computers.

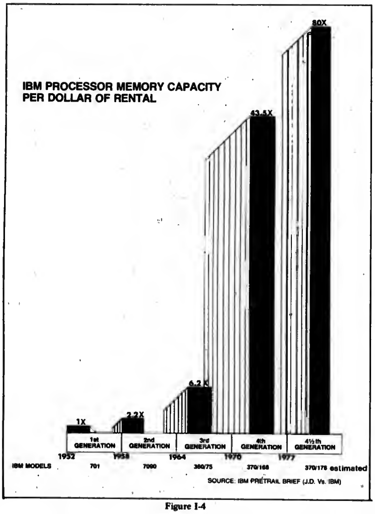
The pervasive role of the computer is today an overriding social as well as business fact. If we examine what has happened in the computer industry and where it is going,

(Continued on Page 11)



SOURCE: IBM PRICE LISTS

Figure 1-3



SOURCE: IBM PRETRAIL BRIEF (J.D. Vs. IBM)

Figure 1-4

# of Change

(Continued from Page 10)

it must be in terms not only of straightforward technical and marketing considerations (although they are very important), but also in terms of the generally high level of user awareness of the computer's capabilities and limitations and of the role we can expect computer networks to play in our lives over the next five to 10 years.

What has happened overall to the computer industry to date? Certainly it has been an uneven history with an admixture of incredibly positive factors . . . and some countervailing negative ones, both actual and frighteningly implicit, as well.

Measuring the Positive

We can point to many statistics and inventions to illustrate the "case" for the past technological breakthroughs and dramatic uses of systems which were not even conceivable 10 to 20 years ago. In looking back, however, we must also ask the question, "Would it have been better if certain companies had not (and did not) dominated the computer and communications industry and, in effect, inhibited growth, in terms not only of technological progress, but also from the standpoint of application usage?"

Let us look first at some of the positive statistics: the number of installed computers (Figure I-2) has grown exponentially from barely 50 systems in 1953 to 175,000 installations last year, and the installed population is projected to nearly double by 1980.

However, the definition of what we call a "computer" in 1980 will certainly have changed substantially compared with that which is accepted vis-a-vis the computers of this period.

At the same time, the number of user organizations has also grown exponentially to over 95,000 in 1976 and is estimated to reach about 240,000 in 1985. In other words, there will be *at least* one installation in every U.S. company or corporation with more than 50 employees in only eight years.

Hardware costs, too, have steadily declined from the $3 million purchase price tag of one-of-a-kind machines in 1953 to $380,000 (or about 1/8 of the original price) for a representative "medium-scale" system in 1976.

For example, in 1964-65 a machine in the IBM 360/40 to 360/50 class cost in the neighborhood of $700,000 to $800,000. In 1976, the IBM 370/125-2 to 138 class machine cost less than $500,000 for a total system (Figure I-3).

System main memory capacity per rental dollar has been a key performance indicator and has also declined substantially. For example (Figure I-4), the IBM 360/75 in the mid-60s offered a capacity roughly 6.2 times that of the 701 of the early '50s. This has increased to 43.5 times with the IBM 370/158 and 168 and is estimated to increase to 80 times the IBM 701 capacity with a future 370/178 or 168-X (announcement anticipated in mid-1977).

Another measurement of qualitative enhancement is expressed as the number of cubic feet per million characters of memory. In the early '50s the IBM Model 650 would occupy 400 cubic feet *if* one million characters were available. By the early '60s this figure was down to 100 cubic feet (1401 and 360/30).

By 1971, there had been a further decrease to eight cubic feet per million characters (in IBM models 135 and 145, which utilize bipolar storage), and in 1973 storage space requirements dropped all the way to one-half cubic foot per megabyte. From 400 cubic feet to 1/2 cubic foot in about 20 years!

It is anticipated that by mid-1977 16K chips should be available in production volumes, thus further reducing space requirements to about 1/8 the current cubic feet per megacharacters of storage (or nearly .063 cubic feet).

There has also been an impressive improvement in auxiliary storage devices. For example, the very early disk drives offered 100 bits of information per inch of track with 20 tracks of information per inch of disk radius; they rotated at 1,200 revolutions per minute. One drive offered a maximum capacity of 5 million characters.

More recent disk drives such as the IBM 3330-11 or its competitor equivalents have over 4,000 bits of data per inch of track with over 370 tracks per inch of disk radius; each disk rotates at 3,600 revolutions *per minute.*

The total storage capacity of a single 3330-11 (or equivalent) is 200 million characters, and the still more recent introduction of the IBM 3350 disk drives (and the competitor equivalents) has nearly doubled that capacity.

In addition, one may anticipate bubble or charge-coupled devices to completely supplant fixed-head, fast access disk files such as the IBM 2305 before 1980 (Figure I-5). Moreover, one may expect disk file capacities of approximately two times that of the 3350, or over one billion characters per drive (two spindles) by 1980. The IBM 3850 mass storage system is also expected to double in density and capacity before 1980.

The total value (if sold) of installed systems (including communications devices and terminals) grew to nearly $60 billion in 1975. The number of installed terminal units of all types exceeded the one million mark in 1975, and the terminal market is expected to grow in dollar value by 30% to 40% annually from 1977 to 1980. Approximately 60% to 65% of all systems today use some type of communications device and communications lines. By 1980, it is estimated that 83% to 87% of all systems in the world will be communications-oriented.

Software Growth

While the installed base and value of computer systems has grown significantly, so have annual total user DP expenditures, to roughly $37 billion in 1975 and a projected $80 billion by 1980 if the current progression continues. Although extrapolations to the 1985 period may be hazardous, if the trend continues without interruption by recessions or decrease in demand, then user expenditures would grow to $139 billion or nearly 7% of the U.S. gross national product in 1985.

However, the projections of hardware cost decline and potential increases in productivity are based on continuous breakthroughs in the state of the art, not only for hardware, but more importantly for *software.* If the existing significant software bottlenecks are not resolved, then the future growth of this industry will be severely constrained and all extrapolations, forecasts and crystal balls will be of little value.

For example, Figure I-6 shows that in 1959 the average design and programming cost per instruction was roughly $4.50. This climbed to over $7 in 1970 and exceeded $7.50 in 1975. Not only users, but also manufacturers are affected by this potentially great inhibitor of industry growth — "software bottlenecks."

The 'Lock-In' Factor

Currently, the development cost (over five years) of an operating system offering a full range of automatic functions and supporting a reasonably global user population typically requires an initial investment of $100 million to $200 million, and the cost trend is definitely up. Moreover, annual maintenance and enhancement costs are growing at a phenomenal rate.

One of the consequences of this trend — the ever-rising software development and maintenance cost — is the "lock-in" factor, in conjunction with which user applications software investment must also be considered. IBM has recently estimated that its customers throughout the world have invested more than $50 billion in applications software alone (double this figure for the total market and vendor software suppliers).

In the 1977 through 1980 period, the "other" manufacturers will have to concentrate more on expanding and migrating their own customer bases instead of trying to capture a share of the IBM base. Other manufacturers are not only affected by the reduction of their potential market resulting from the economic and technical lock-in of IBM users, but also by the steady decline of unit hardware costs.

These vendors are thus forced to increase the total buy by selling larger numbers and varieties of devices in a given installation.

Somehow, the other competing manufacturers — Burroughs, NCR, Honeywell, Univac, ICL, etc. — must concentrate, more than at present, on increasing the functionality of future systems so as to obtain a larger share of the total user DP budget. Working under IBM's price umbrella for survival, they are faced with an awesome task to do this — Justice Department, beware of winning too much from IBM!

In a market where exploitation of the installed customer base or capture of a share of the IBM base are becoming at least as important as teh search for new customers, IBM's power to set de facto industry standards takes on added significance. Through its introduction of the IBM System/32, IBM 5100 and Series 1 minicomputer product lines, IBM is launching an attack to tap the relatively unexploited low-end market.

By these steps, IBM has planted the seeds for its future growth, and has gone some distance toward determining the growth impulse and direction of other companies that would compete in the same marketplaces.

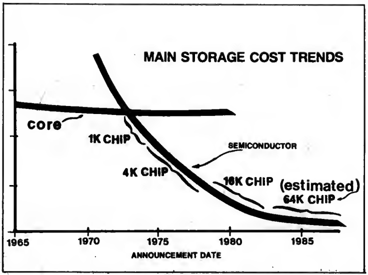
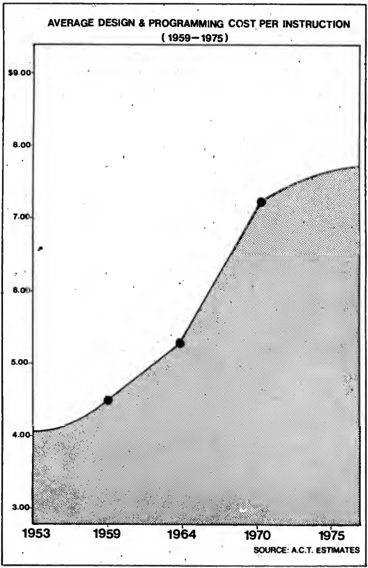


Figure I-5



SOURCE: A.C.T. ESTIMATES

Figure I-6

System Joins Parents, Students in College Selection

By Lou Kirschner
Special to Computerworld

NEPTUNE, N.J. — When you buy 5 pounds of tomatoes or pay for a new roof on your house, you have visual proof of what you are getting for your hard earned money.

However, the general public does not see its children learning to read or to type 60 words per minute.

Nor do people know that for every high school student hired for a part-time job, a high school job counselor has spent many hours talking businessmen into giving those students a chance to work.

The high school guidance office gets little recognition for the work it does to help students choose careers and get placed in college programs.

At the Neptune High School here, a computer was used this year to help the guidance department build better relations with parents while, at the same time, helping students select appropriate career and educational paths.

All high school seniors were invited to visit with their parents on Wednesday evenings to use the computer to help select a college program or occupational education.

The response was amazing in that both parents nearly always showed up. Too many times we never see the father involved because of job commitments.

The first step involved one counselor sitting down with the family to discuss the student's past records, Scholastic Aptitude Test (SAT) results, class rank, personal guidance and how the computer selection process worked.

We felt all this would lead to a better and more accurate selection.

After this counseling was completed, we all sat down at an NCR Corp. 260 printer terminal and one counselor read out the choices selected while the other counselor actually keyed the data into the terminal.

A product of Tymshare, Inc., the college selection program is only one of many systems run on the Asbury Park School System's NCR Century 251 system..

The 512K system supports about 120 terminals in 56 high schools. Inquiries are concentrated at one of seven communications multiplexers to make more efficient use of the system.

Actual Case

The accompanying box illustrates an actual case handled with a male student and both parents present. The more selective a student is in choosing a college, the fewer the number of colleges from which to choose.

The entire time spent between parents, students and accessing the computer was a total of 30 minutes.

For the illustrated case, psychology was the course of study chosen and there were 1,140 colleges that offered degrees in psychology. Other criteria brought the number down to four.

There are about 21 criteria a student may include if he feels they would have a bearing on his choice.

Among them are the length of program, course of study, location, total enrollment and male/female ratio.

Schools can also be considered on the basis of whether they're public or privately run, have a religious affiliation and offer financial aid.

Other criteria include: admissions requirements, tuition, competitive level, SAT requirements, athletic programs and special programs.

The parents and students were saved several frustrating months of looking through catalogs, pamphlets and other paraphernalia which did not pertain to their needs.

The most important product, of course, is that we helped the student choose a college.

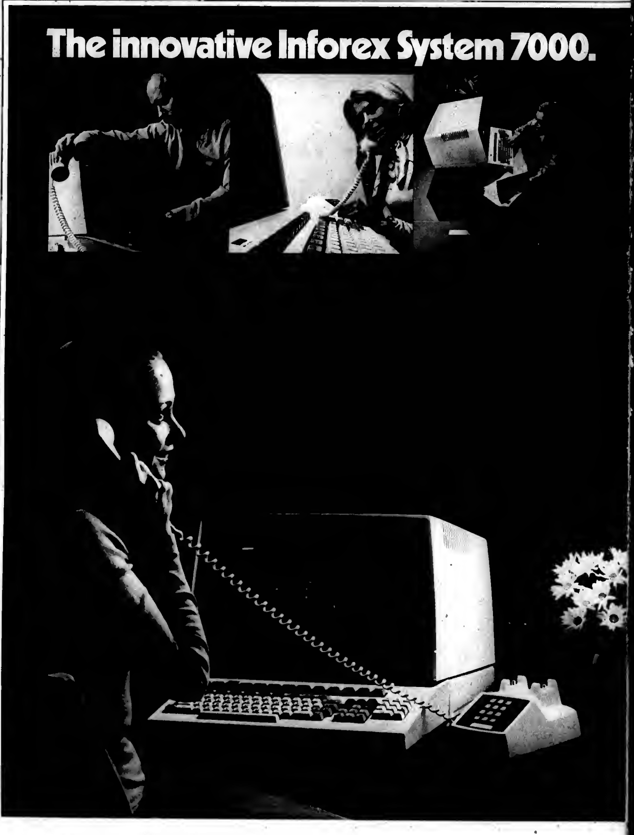
However, there are many strong by-products, such as seeing the parents, presenting to the parents and the public a positive image of the guidance counselor and school and spreading good public relations throughout the township.

We are now teaching our students to run the computer, which is a new experience in itself.

Kirschner is a guidance counselor at Neptune High School.

349	Course of study: Psychology	1,140 colleges remain
432	Area: Mid-Atlantic	229 colleges remain
504	Population of student body: 10,000 and over	34 colleges remain
508	Co-ed	26 colleges remain
515	Public control	19 colleges remain
556	Competitive level	9 colleges remain
590	Tuition, room and board	5 colleges remain
999	Median Verbal SATs	5 colleges remain
995	Medial Math SATs	5 colleges remain
725	Athletic programs: Football	4 colleges remain
Colleges:	Rutgers University State College N.Y. in Albany State College N.Y. in Stony Brook Penn State University	

In this case, the left indicates the code numbers and selection criteria, while the right shows the number of colleges that still meet those criteria.



Corporate User Contributes Facilities

DP Donation Helps Clinic Cut Patient Treatment Time

By Frank Vaughan
Of the CW Staff

CHICAGO — A community mental health center on Chicago's West Side has reduced the average treatment time for its 5,000 clients from 19 months to six months with assistance from a computer.

The system has lifted a heavy paperwork burden from the Garfield Park Comprehensive Community Mental Health Center's staff of 70 mental health workers.

"The less time our staff members have to spend on reports and other paperwork, the more time they have for clients," a spokesman for the mental health facility explained. The center offers a complete range of services, including full hospitalization, home visitation and counseling.

The time savings came in when the Prudential Insurance Co. home office here established a computerized recordkeeping system for the nonprofit clinic. "For us at Prudential, assisting the clinic was another opportunity to put into action some of our beliefs about our corporate social responsibility," Joseph M. Savage, vice-president, said.

"We see Prudential as more than a business. It's a social-economic institution. As such, we think it should help with solutions to social problems to the extent that our capabilities — and primary responsibilities — permit," Savage explained.

"We were happy to share our computer systems expertise with this community mental health effort," he added.

Time From Executives

Several years ago, representatives of the Garfield Park facility contacted Prudential for assistance in revamping the clinic's unwieldy manual recordkeeping system. Prudential responded by asking two of its executives to spend several days visiting the center and evaluating its needs.

The result of their fact-finding and review mission was a recommendation for a system and free Prudential assistance that brought about the recent progress at the center.

Prudential developed and now maintains 13 coordinated programs for the center.

Briefs of activities along with additions, corrections and deletions to previous records are sent to the Prudential center in Chicago, where they are keypunched and sent to the corporate DP center in Minneapolis.

After being run on either an IBM 370/155 or 158, data is transmitted back to Chicago, where it is printed on IBM 1403 printers and returned to the health center.

Records are turned in to Prudential near the end of each month to comply with state requirements and printouts are received in less than a month. All records are, therefore, updated on a monthly basis.

The system permits constant updating of the center's confidential clinic records while maintaining their confidentiality and speeds the production of statistical reports.

The reports are required because the center is both federally and state funded. It is required to submit detailed reports on the activity of its 49 counselors and other staff members in administering eight different programs of mental health assistance.

These reports are now produced in a fraction of the time previously required, freeing the workers to spend three times as much time with clients, clinic spokesmen said.

NCC Bonus in Store For DPers Signing Up For Special Courses

DALLAS — Eleven minicourses will be featured at the National Computer Conference (NCC) here June 14-16 for $30 per course — a price that includes free entry into the exhibit hall, according to Thomas C. White, executive director of the American Federation of Information Processing Societies (Afips).

Topics include "Structured Information" by Robert B. Ware, Ware Associates, Hudson, Mass.; "How to Develop a Long-Range DP Plan" by Ben Knowles, Brandon Systems Institute, Inc., Bethesda, Md.; "Distributed Data Base Networks" by Dr. Leo J. Cohen, Performance Development Corp., Princeton, N.J.; "Introduction to Software Physics" by Kenneth W. Kolence, Institute for Software Engineering, Palo Alto, Calif.; "Introduction to Computer Networks," Dr. Ira W. Cotton, Computer Network Associates, Chevy Chase, Md.; and "The Data Base Administrator," John K. Lyon and Dr. Harold S. Schwenk, BGS Systems, Inc., Lincoln, Mass.

Also, "Comparing Data Base Systems" by Dr. William E. Linn and Thomas F. Meurer, Cullinane Corp., Wellesley, Mass.; "DP Professional Development" by Larry K. Grodman, QED Information Sciences, Inc., Wellesley, Mass.; "Software Design Techniques," Dr. Peter Freeman and Dr. Anthony I. Wasserman, Software Engineering Consultants, Laguna Beach, Calif.; "Microprocessors: Origin and Outlook," Dr. Adam Osborne, Osborne & Associates, Inc., Berkeley, Calif.; and "Structured Design," by Edward Yourdon, Yourdon, Inc., New York, N.Y.

Space is limited, so White urged those interested in the courses to sign up in advance by contacting Afips at 210 Summit Ave., Montvale, N.J. 07645.

Distributed processing has never been easier. Or better.

For a long time now, we've been in the business of making information easy to use. So it's only natural that we'd evolve a system designed to make distributed processing as easy and productive as possible.

That system is the new Inforex System 7000.

System 7000 is a microcomputer-based family of stand-alone and clustered distributed processing systems that features an interactive COBOL compiler, enhanced for data entry. It allows users to perform data entry, data processing, file management, and data communication functions, at any local or remote location. And it can handle all those tasks concurrently. Which is something most systems can't handle at all.

System 7000 has a big 1920-character screen. 16-bit word structure. Virtual storage. Paging. Direct Memory Access. The latest industry standard 1974 ANSI interactive COBOL. Excellent security. Sensible operator aids for increased productivity. And "growability" to meet your future needs.

The system features the most advanced hardware and software available today. Which is just what you'd expect from the company whose products have traditionally been user-oriented and designed for quick installation into areas requiring high productivity.

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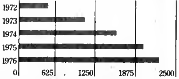

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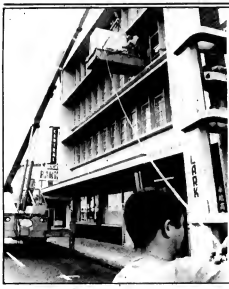

'If at first you don't succeed, try, try again' seems to have been the attitude taken in delivering IBM's latest version of its 370/115 to Honolulu's Central Pacific Bank.

While admitting the window approach is an unusual method of delivery, IBM officials said it is not unique when elevators and stairs prove too narrow.

Toys Made Into Terminals Aiding Handicapped Tots

By John P. Hebert
Of the CW Staff

LEXINGTON, Ky. — Multiple-handicapped and developmentally retarded preschoolers living in rural communities near here are staying out of institutions by playing with common toys converted to computer terminals.

The one- to two-year-olds' newest toys are of the typical department store variety — clown-faced boxes, multicolored kick panels and "busy boxes" — bought or built and electronically modified by personnel at the University of Kentucky Department of Special Education.

By playing with the toys, the children develop motor skills; the terminals and CPU measure the extent of that development.

End in Itself

The two-year federally funded program in which the children are involved is, of sorts, an end in itself: it shows a comprehensive programmed service promoting interaction for such children can be developed to keep them out of institutions, according to Prof. James W. Tawney.

Tawney, who is director of the university's Environmental and Telecommunications Project, said between five and eight preschoolers with problems ranging from severe developmental retardation to cerebral palsy and Down's syndrome (mongolism) receive a systematic, sequential and daily interaction from the computer-based terminals, parents and social workers.

When the children stay in the home, it places severe demands on the parents, although it is better for children in the long run, Tawney said.

The Data General Corp. Nova 1200 minicomputer is being used in the project to demonstrate it is technologically possible to run simple teaching machines with relative high reliability, he added.

The project was designed to overcome the political and geographic barriers to teaching children with these types of problems, according to Tawney, who said many of the children are located in rural mountain communities up to 40 miles away from the school.

The university researchers have compiled data showing the children can interact with the computer-programmed terminal toys in a limited way, the project director said.

The 12K Nova was designed for on-line processing of " very few events" and generates programmed signals to the instructional boxes through a transformer, an acoustic coupler and Wats lines to a modem and transformer in the home, Tawney said.

In addition, the CPU stores signals received from a child's interaction with any of the devices.

Data on a particular child's responses over a specified period of time can then be printed for analysis to determine a more beneficial curriculum for each child, he said.

Effects Vary

The effects of the telecommunications project also vary from child to child, Tawney noted.

In fact, the entire program could be detrimental if there were no outside resource personnel working with the parents. "If there is no human interaction, then there is no system at all," Tawney stated.

And the program can't teach social skill development, gross and fine motor skills or language and concept learning.

But it is helping to promote interaction on the part of handicapped children and showing that comprehensive delivery systems can be designed for their families, he said.

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Editorials

Ethics Up for Grabs

Few can deny that as DP continues to assume more of the day-to-day recordkeeping of both small and large organizations and governments, the need grows for responsible, ethical people in the DP field.

DP is now at the point where it is generally perceived to be an incredibly powerful tool. As yet, legislatures have refrained from barging in and issuing regulations.

However, if the DP community is not able to convince the world at large that it has an effective self-regulation program well under way, there may be no stopping intrusions from well-intentioned but probably misinformed legislatures.

But of the four major DP organizations recently polled, none could recall initiating steps to reprimand anyone for violation of their codes of ethics.

If societies have such misgivings, they should move to delegate enforcement procedures to another organization.

This logically could be the Institute for the Certification of Computer Professionals, which was established as an umbrella organization to apply certification standards to DPers in general, not those belonging to a specific society.

Nonpublic Pricing

There are some industry suppliers that believe a discussion of detailed pricing information should be restricted to controlled conditions between a vendor and his customer.

These companies are hesitant to give product prices in press releases for reasons which have never been fully explained.

But the Burroughs Corp. recently added a new factor to the practice of keeping product prices within a controlled domain.

In response to a question relating to an announced product, a Burroughs spokesman said cost information about the device was "nonpublic" (see Page 31). The use of such a phrase from one of the largest computer equipment suppliers raises some serious concerns from users and vendors alike.

The equipment used by customers to operate their DP centers is complex and costly. Most DP centers operate within tightly controlled budgetary guidelines. In such situations, the price of a product often makes the difference between considering its capabilities or looking elsewhere.

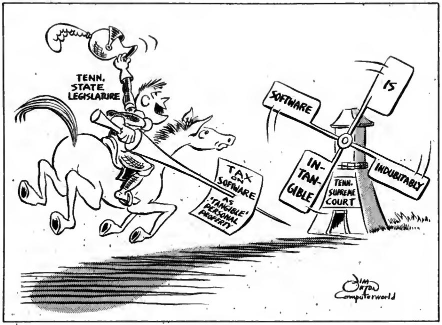
Vendors that will give detailed prices only as part of a sales call are putting an unfair burden on both the potential buyer and their own representatives.

The implications of such practices are that the exact price might depend on what kind of a discount or other concession the vendor is willing to make.

In many instances, users get basic pricing data from product stories in the press. Because of space limitations, these articles can do little more than provide a basic price range from which the user can decide whether he wants to discuss the product further with the vendor.

But when prices released for publication are obviously incorrect, the potential customer has been led down the garden path. The result is that the customer loses confidence in both the vendor and published reports of such products.

Fortunately, these practices are carried on by a limited number of companies. The rest of the industry should make it clear to these vendors that unrestricted competition for the user's dollar is the only way to assure continued progress.



'Ch-a-a-rge!'

Letters to the Editor

Software Audit Proposed As Statistical Proof Repository

The predicament discussed by Don Leavitt ["New Ideas Sought to Bring Order to Package Surveys," CW, April 4] is the predicament of software users and the DP industry itself.

Presently, there is simply no place where anyone can go to obtain hard, objective facts about the number of people who use a software product, what the total sales volume of that product is and how the product performs "across a spectrum of sites."

Both Datapro's Software Honor Roll and International Computer Programs, Inc.'s (ICP) Million Dollar Awards serve a useful function. The difficulty is that both organizations receive statistical information from vendors, and they have no economic incentive to audit that information.

As a result, both software users and vendors suffer from some very unreliable and confusing figures. And software is, most emphatically, an area where accurate information is critically important.

Since Leavitt asked for ideas, we will be glad to supply one. We believe the industry badly needs a kind of "repository of statistical proof" — a Software Audit Bureau, for lack of a better name.

This bureau would receive statistical information from vendors on their number of users and total sales volume. The bureau would check those figures, by statistical sampling methods, and certify the figures were correct within a certain reasonable percentage of error.

This type of certified information should be invaluable to users, vendors and, finally, to such organizations as Datapro, ICP and Auerbach. These organizations could then tend to their primary jobs — disseminating DP information and recognizing outstanding accomplishment.

Aso Tavitian
President

Whitlow Computer Systems, Inc.
Englewood Cliffs, N.J.

Sources Split on Disk vs. Disc

I agree with Florence Lazar: let's "leave 'disc' to the discus thrower" [CW, April 4]. However, my reasons are different.

My statement, "computer oriented . . . dictionaries evidently prefer 'disc,'" ["Disc vs. Disk Controversy: One of Life's Small Wars," CW, March 21] disqualifies *The American Heritage Dictionary* as a reflector of computer industry usage. I referenced the *Heritage* as expressing the layman's point of view only. And I would put *Webster's New Collegiate Dictionary* and the *New York Times Style Book* in the same category.

The "computer-oriented" sources that prefer "disc" include: *Hayden's Standard Dictionary of Computers and Information Processing, Ansi Standard Vocabulary for Information Processing, Computer Control Glossary — Instruments and Control Systems, Purdue Workshop Glossary of Industrial Control Technology* and *Computer Design* magazine.

However, "more general technological" sources that prefer "disk" include: *McGraw-Hill Encyclopedia of Instrumentation and Control*, Van Nostrand's *Scientific Encyclopedia*, Chambers *Dictionary of Science and Technology*, *McGraw-Hill Encyclopedia of Science and Technology* and *Electronics* magazine.

At last count, it was still about even.

From one "k" advocate to another, welcome to the war.

J.D. Crawford

Foxboro, Mass.

Computerworld welcomes comments from its readers. Preference will be given to letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Data Past

Five Years Ago
April 19, 1972

WASHINGTON, D.C. — The General Services Administration (GSA) standardized job descriptions for DP personnel services. Region 3 of the GSA issued the standards as part of a Basic Ordering Agreement which required software firms to post standard prices for the various services.

— — —

DAYTON, Ohio — NCR Corp. introduced the Century 101. The model offered twice the memory capacity of the Century 100 and could process a typical instruction mix 2.5 times as fast as the Century 100 and half as fast as the Century 200.

Eight Years Ago
April 23, 1969

WASHINGTON, D.C. — The Defense Department said outside vendors of plug-to-plug compatible peripherals should be given equal consideration with the vendors of CPUs already installed in the department in all cases where peripherals were being added or replaced.

— — —

ORANGE, Calif. — A computer aimed at the industrial automation market and said to be fully compatible with both the IBM 1800 and 1130 was introduced by General Automation, Inc. The basic system price, with paper tape and keyboard, was to be "less than $20,000," a company spokesman said, adding the price of a GA 18/30 system was "less than 40% of the equivalent IBM 1800."

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Real Profits Key Measure of Business System Success

By Jack Stone
Special to Computerworld

The great controversy about system validity rolls on. Some organizations refer to the subject as "assessment," others use the word "justification," and still others use such terms as "performance," "efficacy" and "appraisal."

Regardless of the label, it seems clear to me that the clearest statement of value of a business system is the amount of dollars the system adds to the company profit line.

Some people argue that certain systems have inherent characteristics which do not permit the construction of validity standards or are not amenable to performance measurements against established norms. These individuals conclude that many DP systems can be justified on the basis of common sense alone.

But I wonder just how many such systems have in fact clearly proved to be profitable to the company. Too often crucial feasibility studies are glossed over, systems' objectives are vague and performance standards are abstruse.

I simply fail to see how a business can prove to itself that a system is economically justified without incorporating quantitative financial goals and measurements.

I recently came across one example of a system whose successful performance is vividly demonstrated in great measure because the system is directly tied to business profits.

I interviewed Wolf Baumbach, general manager of the new Holiday Inn of Georgetown in Washington, D.C., who talked about Holidex — his company's international reservations system.

Q. Wolf, what has been your history in the hotel business?

A. I have been in the food and lodging industry for about 12 years. During that time, I received my degree in hotel management. For the past five years, I have been a manager with my current organization.

Q. Have you had much intimate involvement with computing systems?

A. Until I joined Holiday Inns, I really did not have any significant exposure. Then, as part of the regular indoctrination for new managers, my company sent me to the management seminar program at the Holiday Inn University in our Memphis headquarters, which included several days of computer applications instruction.

Specifically, the training concentrated on our computer-based reservations system and covered basic computer principles and functional characteristics of the Holidex, and its terminal characteristics, operations and applications.

Q. Can you briefly describe your reservations system?

A. Surely. As in most reservations systems, a master data base of hotel capacities and bookings is maintained at our corporate headquarters.

Reservation requests are entered from terminals located in our inns and reservation centers throughout the world, requesting space in any place in the hotel chain. Requests are entered and, upon availability, confirmed.

The system also handles alternate bookings, rejections and cancellations.

Although the reservation function is the primary use of the system, the existence of the centralized data base has allowed the development of some very useful support applications.

Q. Could you comment on some of these applications?

A. Certainly. The system communications network is used frequently for transmitting messages among our many inns and headquarters. The messages are all funneled to the central computing facility for recording purposes and then forwarded to their destination.

We also have the capability for sending broadcast messages from the center to all hotel units.

Another application which is particularly useful to me is the capability for entering important management data and sending regular management reports over the terminals. I am able to receive timely, comprehensive information for the precision management of my inn.

The Human Connection

Our marketing people have also developed analytical techniques which they use to obtain statistics on out-of-town reservations and other valuable information for market forecasting and new product programs. We even have the facility for extending limited cash refunds in the event of loss of certain travelers' checks.

Q. You must have quite a computer complex to support the thousands of terminals in your hotel chain.

A. I understand that it is the largest and most sophisticated in our industry and it also supports a number of major industrial corporations, airlines and travel agents who tie directly into the system.

Q. Has the training of terminal operators been a problem?

A. No, it has not, thank goodness. Over the years, the computer people evolved the design of an extremely simple and reliable terminal specifically for the needs of our inns. They have supported the terminal with excellent audiovisual materials, which are used on both a self-teaching and monitored basis.

The materials, by the way, are part of a complete library of our training supplies that are available at each hotel location.

Q. I was curious about the fact that your organization has recently acquired the former Wellington apartment-hotel as the Holiday Inn-Georgetown facility.

A. Actually, we do not own the hotel, but have a management contract with the owner.

Q. Is this a new type of business for your company?

A. Our company has been engaged in this type of operation for some time. We find it to be a significant adjunct to our regular arrangements involving franchises and company-owned properties.

Q. What did your company bring to the Wellington when you consummated your agreement?

A. Two major items. First, the identification of a local hotel with an internationally known hotel organization. Second, a reliable computer system for world-wide reservations, guided by experienced management.

Q. Just how valid is the computer system for your Holiday Inn?

A. We have more than doubled the business since we took over six weeks ago.

Readers who have had successful experiences with demonstrably profitable systems are invited to describe their situations in correspondence directed to Stone, Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

To Avoid Scapegoats

Dangerous Data Bases Need Systematic Handling Now

A recent National Bureau of Standards (NBS) publication — "Accessing Individual Records from Personal Data Files Using Non-Unique Identifiers" — dealt rather well with identifying some of the problems involved with permanently dangerous data bases — namely, data bases that will give wrong answers.

The Taylor Report
By
Alan Taylor, CDP

In this case, NBS dealt with the problems of identifying the wrong person, which can be rather dangerous in the events of giving wrong medical treatment, incorrectly notifying police forces and so on.

However, other dangers that exist in other mistake-prone data bases are quite possibly more dangerous — although not so dramatic.

Authorizing the mailing of data to wrong addresses, usage of wrong spare parts (even condemned ones) and all the other things that can happen when data bases give a wrong answer require equal consideration.

The NBS report did not forget to think about these things.

One section under the heading "Manual Checks For Accuracy" concluded there is no substitute for human judgment.

The section also stated it is very dangerous to live with unchecked data — a point with which I certainly concur.

The report stated that if four measures are present, then the data base side has done enough and it is now the responsibility of the "specially trained human."

The four measures are as follows: (1) Printing potential identification data after entry to data base. (2) Checking (1) against input document. (3) Repeating (1), (2) against update inputs. (4) Training someone for something to some extent.

These measures, in so far as they mean anything at all, are simply input accuracy checks. They have nothing whatsoever to do with the problems of mistaken identities, which is supposed to be the subject of the report.

In particular, they fail to bring out the items that only the data base can bring out; without which, any human judgment to use or not use apparent data base output is being made in a vacuum.

Adequately Informing Humans

The duty of a dangerous data base is to adequately inform humans — who are apparently to be the deciding factor — about the dangers involved.

This duty breaks down into two areas:

(1) Data Base Related Dangers, including data base reliability, selection decision, alternatives and absences, and confirmation possibilities.

(2) Proposed Action Dangers, including data on the error envelope and the impact of the proposed action if a mistake is made.

Data base related dangers would include, for instance, a statement as to the most recent level of reliability of data base. An extract from the latest audit report might be included, "One in 396 reports properly made was found to be in error"; for instance, it informs the human about the broad statistical situation.

Without this information, the person may either exaggerate the possibilities of error (remembering the rows that occurred when an error was found) or else minimize them for one reason or another.

Another data base related danger is the method by which the selection was made and the alternatives rejected by the data base. Did, for instance, John Smith have his record chosen over J. Smith because the given birthdate was nearer to the recorded one than was J. Smith's?

Only the data base can know the basis of rejections; and yet both this basis and the rejected records must be made available to the human reviewer because there may be special reasons to reverse the automated rejection.

A nearness of birthdate, for instance, can be misleading because many records use standard fictional birthdates (first day of month, first month of year, etc.) rather than admit they don't know the birthdate and put blanks or zeros in the fields.

A trained reviewer looking at the record would discount that birthdate nearness if the match was using one (or worse both) dates in such a fictional form.

Alternatives and Absences

Measurement of alternatives and absences is another area in which the reviewer needs guidance from the data base.

The report pointed out that the risk of false drops increases both with the increase in size of the population and with the commonness of the individual identifiers.

The reviewer may have an instinctive understanding that James Brown is a lot more likely to be a false drop than Jaminar Hojdka, but even so, a review should take into account the number of near misses that can be found. This should include phonetic misspellings — as in telephone directories.

Areas in a data base that are not 100% covered should also be noted. Perhaps the base is only partially loaded with residents of the Seattle area and the match selected is using a Seattle address. The reviewer should be told about these, too.

Another area in which the data base has the information, and the human does not, lies in the confirmation possibilities that can discriminate either one possible record against another or else provide a level of confirmation in itself.

The data base could say that the person had some specific scar or else that the decision as to which of two people who are in the data base could best be determined would be by a blood test.

Again, only the data base can know that this would be sufficient to confirm close-call decisions, so it is up to the data base to provide this information.

Even when the data base has exhausted all the items that it alone knows about, its usefulness in preventing dangers has not ended. It can be given more information about what the proposed actions are and then check into the various other people within the error envelope to see what level of danger is involved if an error is made.

Again, this is something that the human reviewer, not having access to the error-envelope, can't do no matter what.

Thus, before a particular drug was given to a selected, identified patient, all the other people known to the data base who might be the actual although mistaken recipients of the drug would be checked for contraindications.

If there is one who will go into a permanent coma, for instance, then the reviewer certainly needs to know about it.

In general, the whole development of systematic handling of dangerous data bases has not even begun. It isn't hard; it can be done. However, the use of human scapegoats instead of accepting that the work will be needed before dangerous data bases can be safely used is at least inadequate and badly mars an otherwise useful study of the problem.

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Reader Commentary

Editorial Contained Misconceptions

Revise – Don't Sacrifice – Software Patent System

By Martin A. Goetz
Special to Computerworld

The editorial, "A Realistic Method" [CW, March 21] contained a great number of misconceptions concerning the very important subject of the use of U.S. copyright and patent laws for software protection. In response, I would like to take exception to the following positions presented therein:

The editorial recommended the industry support copyright protection over patents.

The copyright and patent systems do not conflict with one another, so there is no justifiable reason for the software industry to choose between them. As potential sources of protection, these two systems can have considerable economic impact on both software users and software vendors.

By abandoning one or the other, we would only lose a source of protection without any compensating gain.

The editorial stated the National Commission on New Technological Uses of Copyrighted Works (Contu) is currently "on the verge of recommending copyright protection for computer programs and data bases."

Computer programs are already protected under current copyright statutes. IBM, independent software companies and users alike have been copyrighting their computer programs for the last 10 years or more.

Contu is examining possible revisions to the copyright statutes which would improve this protection: (1) by more specifically documenting those conditions which would constitute a violation of a copyright and (2) by more explicitly stating those forms of a program (i.e., source, object, micro code, etc.) which would be granted copyright protection.

Additionally, Contu is examining a host of other areas related to input and output data, to and from a computer, to determine whether such data warrants specific protection via further revisions to existing copyright law.

The editorial indicated patents should not protect computer programs.

The proponents of patent protection for "machine systems implemented in software" have never advocated "patent protection for computer programs.". This distinction is not merely a play on words.

In fact, this distinction is at the heart of ongoing controversy within the computer industry relative to the patentability of software. The issue, as presented in the recent software patent cases before the Court of Custom and Patent Appeals (Prater-Wei [1969], Benson [1972], Johnston [1975], Knoll [1976], Chatfield [1976] and others) and the U.S. Supreme Court, is:

"whether a machine system implemented in software (a computer program) is equally as patentable as the same machine system implemented in hardware (a series of hard-wired circuits)."

The Patent Office has always awarded a patent to a "machine system" implemented in hardware if it meets the high standards imposed by the patent system, as defined by Congress. It has always been the clear consensus of the Court of Custom and Patent Appeals that "machine systems when implemented in software are patentable subject matter."

It is therefore our belief that machine systems when implemented in firmware, microcode or computer programs are patentable. The implementation itself would be protected by the copyright statutes, should such implementation occur.

It is the machine system for which we seek patentability.— not the implementation itself. And it is our position that a valid patent on a machine system would prohibit a competitor from incorporating that machine system into a hardware circuit or a computer program.

In taking a position relative to this complex issue, *Computerworld* should tread very carefully. The patent system may be in need of revisions, but since 1790 nothing has been proposed which can replace it.

In fact, many companies owe their very survival in the competitive marketplace to this form of protection.

CW may believe it is making an important contribution by recommending elimination of patent protection for the software segment of the computer industry. But I am convinced that such a recommendation is based on incorrect assumptions.

I therefore urge CW to print several of the most recent briefs in favor of patenting so that CW readers can gain a clearer insight into the real legal arguments.

Goetz is senior vice-president of Applied Data Research, Inc.

Letters to The Editor

CDP Exam Worthwhile, But Needs Improvement

Regarding the article by A.V. Dundzila ["Quality of CDP Exam Material Seen in Need of Improvement," CW, March 7], my response is "Hear!, Hear!"

I noticed two flagrant errors in the software section which I have already reported to the Institute for the Certification of Computer Professionals. Also, like Dundzila, I questioned how one technique was applicable to more than one section of the exam, break-even analysis being the prime candidate for this dubious distinction.

In the analysis and design section it seemed the vast majority of questions were open to what people in the sports world refer to as a "judgment call."

If you read a text by a specific author and recalled a passage also, you could answer some questions "correctly"; otherwise, you would answer based on your experiences.

I tend to agree with Dundzila that such an exam is worthwhile when properly designed.

However, I believe those who took the exam had a right to expect a higher quality exam from a national certifying organization.

Earl Chrysler
Cedar Falls, Iowa

Unfortunate Analogy

Michael Lopez's use of the Datsun/Cadillac analogy [CW, April 4] regarding George Derry's article on shared hospital systems [CW, March 21] was unfortunate.

A Datsun (or other small car) is a better car than a Cadillac, if one simply wants to use a car to get from here to there. It is better based on maneuverability and operational cost and equal based on reliability.

Fortunately for the Cadillac (and for other cars of its ilk), there are plenty of fools who care nothing for cost and energy considerations and are willing to pay triple the price for a smoother ride, power-everything and, mostly, the oohs and aahs of others.

Not many hospital patients desire to pay a per diem premium for staying in a health care facility with white-walls on its computer.

Advocates of hospital computer pizzazz better come up with a strong case that recognizes the hospital as a financially responsible institution.

K.I. Cohen
Wood Dale, Ill.

Report Guides DBMS Users

In connection with Stephen L. Robinson's article ["Cautious Approach Works When Buying Car or DBMS," CW, March 28], I would like to remind *Computerworld* readers of the existence of the Codasyl Systems Committee's latest technical report — "Selection and Acquisition of DBMS" (March 1976).

This report covers in great detail user guidelines for the process outlined in the article.

It is available for $12 from the ACM Order Department, Box 12105, Church St. Station, New York, N.Y. 10249.

John W. Young Jr.
Vice-Chairman
Codasyl Systems Committee
San Diego, Calif.

Staying in a Vicious Circle

Regarding the editorial "Damned If You Do . . ." [CW, March 7], the only thing wrong with facing a "360° change" is that you may have to go around in a circle, but you would still be headed in the same direction (as compared to facing a 180° change).

C.N. Floyd
Tulsa, Okla.

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Despite Doubtful Documentation

User Pairs Packages, Gains Control of Tape Library

By John Dedimincus
Special to Computerworld

EDITOR'S PARK, Md. — About three years ago, when Kiplinger Washington Editors decided to purchase a tape management system, we were converting from DOS to VS1. At the time, we had two tape librarians and about 4,000 tape volumes.

As we got into the conversion, we found our existing library control procedures under DOS were insufficient in an OS/VS1 environment. We simply needed better control.

Also, making external tape labels was taking 15% to 20% of the operators' time.This combination of problems made us look for a packaged tape management system.

We were already familiar with two systems and only considered those two. Both systems were good, but we finally chose University Computing Co.'s (UCC) Tape Management System (UCC ONE) because we found some features that we preferred — mainly the backup and recovery capability and the on-line inquiry and update capability — over the other system.

After we purchased UCC ONE, we had the system up and running within a week. We couldn't have picked a better time to install a tape management system. We simply cataloged volumes into UCC ONE as we converted them from DOS.

One systems programmer assisted the UCC technician in the initial installation. Two tape librarians were primarily involved in maintaining both the DOS library system and the UCC ONE scratch pools. That was the extent of the implementation.

From a systems standpoint, we began to feel comfortable with UCC ONE right away. It took the tape librarian about 30 days to get used to UCC ONE being in control and to completely understand the capabilities of the system.

The only real problem we found was the documentation, and in particular, we felt the documentation on the Vault system — which would support use of multiple storage locations — was inadequate.

In the three years we've had UCC ONE, the documentation has gotten better, although it still needs some improvement.

We haven't really modified our system since it was installed, but we did add Applied Data Research's Roscoe — an on-line source program maintenance system. So, what we have is on-line maintenance to the Tape Management Catalog through Roscoe.

We were able to take advantage of all UCC ONE's features almost immediately except for Vault System, Password and Auxiliary Disposition.

Even though we wanted to use Vault System right away, the documentation hindered us. It took us about 30 days to get something working in that area.

At the time of installation, we didn't have a requirement for Password, but about a year later, we started using that feature and have been using it ever since.

We still don't have a requirement to use the Auxiliary Disposition — a feature that would allow us to provide additional instructions to the operators.

We have had only one tape librarian since we implemented the UCC ONE system, yet we have never had better control and have never lost a tape volume.

We also find that operators have more time to operate because they aren't involved in making external tape labels.

We process about 500 tapes from outside companies a month, and UCC ONE does give us much, much better control than we ever had before. We also have better control over the 200 tapes we send out each month.

With the scratch and clean capability offered by UCC ONE, we have a more efficient tape cleaning procedure than we have ever had.

Because of our reliance and the capabilities of the system, we leave the write rings in all the tape reels all the time. When we started doing that, we had to go out and buy about three barrels of write rings.

Needs Not Unique

The needs of Kiplinger Washington Editors are probably no different from those of other companies. We feel we are fairly typical in our software needs and do use quite a few software packages from several different software vendors.

Vendor software is great if the need exists and if a firm can't do it any cheaper or better in-house.

If we have a need for a package and find it not feasible to do ourselves, we'll definitely go outside, test it and, if it works well, buy it.

We've tried to give our programmers the best environment possible in which to produce efficient systems in the least time.

Dedimincus is supervisor of DP support for Kiplinger Washington Editors in Editors Park, Md.

DX/RSTS Links Time-Sharing To Word Processing Systems

MAYNARD, Mass. — Digital Equipment Corp. has introduced software that links PDP-8-based word processing systems and PDP-11 time-sharing systems.

DX/RSTS provides word processing resources to a PDP-11 operating under the RSTS/E executive, a DEC spokesman explained.

The linkage permits file transfer between the two systems and works in both directions: the word processing system users can access the greater file storage available under RSTS/E as well as the high-speed line printer normally attached to the PDP-11, he said.

Extending the DP capabilities of the RSTS/E user to include word processing is advantageous to firms involved with publications such as multipage contract proposals, he added.

They can maintain a central base of publication elements on the PDP-11, but can retrieve them for assembly as custom-tailored documents produced by the PDP-8 word processor, he continued.

The linkage can be useful to DP professionals as well, the spokesman said. For example, the word processing editor allows programmers to create or modify either Assembler or high-level language programs more easily than with editors normally available under RSTS/E, he noted.

Switching back to concern for the word processing staff, he indicated that the large disks available on the PDP-11 are far more appropriate for large documents than are the floppy disks on the PDP-8.

Under DX/RSTS, the PDP-11 appears to the PDP-8 to be another word processing system, while the PDP-11 appears to the PDP-8 to be another time-sharing terminal, he explained.

The software runs on the PDP-11, can be licensed for $2,500 and is scheduled for delivery in mid-July, DEC said.

Utility Eases 'Power' Tape Use

DALLAS — The Power and Power/VS Report Manager packages from Sercon Corp. resolve various problems that often occur when users running under IBM's Power or Power/VS spooling software put their reports on tape instead of disk, according to a Sercon spokesman.

There are valid reasons for using tape instead of disk as intermediate storage for printer output, but that option can create a less flexible environment for the console operator and a lot more work for the clerk charged with distributing the output as well as a need for more tape drives, he pointed out.

The Sercon packages solve these problems by handling a tape drive much as if it were a disk drive. Print jobs may be extracted from the Power or Power/VS queues and spooled from any partition to a single tape drive.

The print jobs must be in the HOLD state to qualify for selection. The selection itself may be by class, job name or job name prefix. The non-VS Report Manager also allows selection by partition.

Once the selection sequence is complete; print jobs may be selectively released from the power queues, or they may be released by the operator from the HOLD state and printed on-line with Power or Power/VS if a hard copy is needed more immediately than is possible with spooling.

A user exit from the Sercon packages supports such operations as computer output microfilming, creation of "banner pages" to highlight changes in distribution patterns and support for non-IBM peripherals attached to an IBM mainframe.

Yearly leasing fee for either of the Report Managers is $750, Sercon said from 4611 N. Lindhurst, Dallas, Texas 75220.

Descriptors Added To Bank Statements

OAK BROOK, Ill. — The Demand Deposit/Credit Reserve System software from the Weiland Computer Group, Inc. has been enhanced to include descriptive entries and combined account statement features, the vendor said.

The package now provides an IBM-based bank, running under DOS or DOS/VS, with phrases added to demand deposit transactions to describe them more fully than the single-digit codes typically used.

These phrases may be standard descriptors from the National Automated Clearing House Association or any of 100 variable, bank-defined phrases, a spokesman noted.

Checks may be listed in serial number order, rather than in data-processed order, to simplify customer reconciliation of the statement, he added.

The basic content of the statement may be expanded to summarize related account balances, interest accruals and loan payment information.

If a customer is participating in the credit reserve system, the statement will show the loan balance, late charge, payment data and yearly finance charge.

The result, Weiland said, is a fully descriptive single statement that shows the customer's financial status with the bank.

Written in BAL, the package runs on IBM 360/370 equipment and requires 65K bytes of memory under DOS.

It costs $39,000, the vendor said from 814 Commerce Drive, Suite 101, Oak Brook, Ill. 60521.

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'Pams' Service Aids Tenant Managers

MIDDLEBURY, Conn. — The Property and Accounting Management System (Pams) service, now available from Computeristics, Inc. remote computing facilities, provides managers with a complete audit trail of transactions through tenant accounting, general ledger and financial reports, according to the vendor.

A client may use the complete service or choose either property management or accounting managements, a spokesman added.

The service includes support in the form of preprinted and prepunched payment coupons for tenants and exception reports that highlight delinquencies, lease expirations and vacancies.

Each tenant is assigned a number which remains a part of the master file until the tenant has moved out, paid all charges and received any security deposit to which he is entitled.

The system generates monthly billings by tenant and in totals summarized for management.

Nine current charges can be assigned to each tenant, including rent, garage, storage, late charges and court costs, among others.

The system will apply the tenant's payments based on the priority the user assigns to each charge, according to a spokesman.

For financial reports, users can choose Computeristics' standard forms or others, whether currently part of the user's system or custom designed concurrent with the move to Pams, he added.

Although designed to work through remote job entry (RJE) terminals at user offices, Pams can be used through the mails or, in some of the larger cities such as New York, through pick-up and delivery services working with RJE offices run by Computeristics, he said.

Computeristics has computer centers in Michigan. Its corporate headquarters are located at Oxford Management and Research Park, Middlebury, Conn. 06749.

Package Creates RPG-II Writeups

WARRENVILLE, Ill. — The Kwic II package from Katwil International is said to provide more system documentation than is available elsewhere for RPG-II programs being run on IBM 3s and System 32s.

Developed originally for Katwil's own use, the package analyzes the user's source code and OCL statements.

From that it produces, among other things, a cross-reference listing showing every program procedure that uses each of the files on the system.

Reversing that orientation, Kwic II also shows all the files used by each program procedure.

This listing shows the physical characteristics of the files, including tracks in use, record and block length and the type of file — input, retain or output — as defined in the user's specifications.

Basic record layouts, source and OCL listings and "of course" run books are also generated by the package, the spokesman noted.

Flowcharts, printer output formats and "various other reports" should be ready in the near future, he added.

Service or Package

The capabilities of Kwic II are available on a service basis as well as in a package for a user's inhouse installation.

Katwil will accept programs and OCL sent in by users on virtually any media — cards, disk, floppy disk — and guarantees confidentiality and prompt return of the material and the Kwic II output.

The company charges approximately $200/run for work done on a service basis. A one-year lease of the package costs $150/mo.

Katwil can be reached through P.O. Box 217, Warrenville, Ill. 60555.

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'UMS' Gives Constant Overview of Company's Projects

By Anthony C. Constable
Special to Computerworld

Using a computer to provide each part of an organization with live data concerning its unique operation is almost a routine application for today's large computers. But instantaneous consolidation and dissemination of the pulse data of an organization has never really been attempted.

Concepts and Techniques

I can visualize a system that could tie together all the major activities of even the largest corporation for the purpose of allowing management at all levels to view their areas of responsibility as through a moving window while the corporate machine is in motion.

I call this concept the Universal Management System (UMS) and predict that it or derivatives of it will become an integral part of the corporate management schemes of the 1980s.

Greater Efficiency, More Profits

Several of the smoother flowing large data centers in the U.S. are beginning to employ such systems to control and monitor their complex work flows and improve the service level to their users. This in turn means greater efficiency and therefore a competitive edge — thus, greater profits.

Data centers that do not have such systems rely upon traditional "it's all in our heads" approach to getting the job done. The problem is that everything is not in anyone's head.

Change, efficiency and job satisfaction, therefore, have to be generated by the individuals rather than by the organization itself. This tends to create bureaucracy because aggressive management is not possible when a manager has to deal with such "vested" knowledge.

Consider the following situation: A large bank decides a certain developing community within its operating area can sustain a branch office. Such a decision is routine to the bank's administration; the many departments involved routinely execute all of the steps necessary to build the branch office.

Eventually, a year or two later, the branch is completed and is producing profits.

Could it have happened sooner? Could it have been done cheaper? Did the bank as an organization learn anything?

Yes is probably a good answer to each of these questions — but where is the data? It is where we left it, in people's heads.

Under UMS, such an operation will be mainly computer-controlled. The description of the standard steps involved in the development of a branch office will be a prestored network of events in the data base of a computerized UMS.

When a decision is made to build a branch, this network will be uniquely activated. The steps to be accomplished will be shown on CRT terminals, in time and event sequence, to those departments within the bank required to perform the functions.

At any one time, a department will be shown those events that are either being worked on, ready to be worked on or whose immediate predecessor tasks are being worked on.

Ramifications of Control

For UMS, it is the concept of actions triggering reactions that is the key. Once the events are identified and set up as networks under UMS, they can be married to calendar extraction criteria, descriptive commentary data and time and resource requirement data to form a comprehensive inventory of what has to happen, when and where and what it takes to do it.

At this point you may be wondering whether all of this data can be collected. My experience says it is possible and its achievement means liberation for effective managers. Further, our failure to capture the data that describes how a business operates means we are open to both individual and organized blackmail.

We should examine some of the ramifications of such control. First, departments are made aware of what they have to do and when to do their part of each project or network under UMS control. Since the CRTs are two-way communication devices, they would be used to communicate event status to the system. This would allow UMS to:

- Log actual event start and completion times.
- Change the status of dependent activity.
- Keep each department informed of the status of its workload across all projects.

We have, in short, given the data back to the groups that know the most about it.

Second, each division of the corporation now has the ability to view the status of each project under its control or in which it participates. In addition, management can interrogate the UMS data base to find projects that are behind or ahead of schedule, performance data and project completion estimates.

This would give rise to increased productivity and greater understanding of common problems.

Third, since UMS places CRTs in all corporate departments, we will have a built-in, corporatewide network ideally suited for message switching.

Such instant communications without jangling telephone will be a quantum advance over the paperwork that is today's corporate communication standard. Built into this message-switching capability would be an acknowledgement mechanism and the option to produce hard copy.

Fourth, as a result of the corporation regaining control of its day-to-day business activities, top management will be in a position to see both workflow bottlenecks and slack capacity and perhaps to balance the operation better.

The UMS concept can be taken to several levels of precision. Earlier, calendar extraction and resource requirement data was mentioned. This data could be used to produce preschedules and forecasts of future activities so the planning function can be included in the UMS concepts.

Add to this unit costing of the resources, and budgets can be produced in advance of the event.

With this costed preschedule data, we can now monitor performance according to schedule accurately. Performance according to cost estimate can be tracked simultaneously.

Bad or Benevolent?

UMS could be viewed as a computerized "Big Brother" watching us all very closely. It could also be looked at as a benevolent

(Continued on Page 24)

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DBMS on Mini Helps N.Y. Bank Control Handling of Securities

NEW YORK — A securities-handling and recordkeeping system featuring a central data base management system (DBMS) is speeding accurate and timely management reports for Citibank's U.S. Money Market Division, the user said.

During implementation of its Securities Processing and Record Keeping System (Sparks) last August, the division created the data base consisting mainly of customer and security information. The customer file includes names, addresses and additional information relating to the physical delivery of securities purchased by each specific instrument including issue date, interest rate and maturity data.

That base allows for the timely and accurate preparation of a variety of internal management reports on the division's varied positions on each security, according to Anthony S. Pagoto, assistant vice-president in charge of automation for the division.

Sparks replaced a collection of antiquated business machines and labor-intensive workflows, "a scenario which made accurate reconcilement of information difficult," Pagoto explained.

"Transactions are initiated by salesmen in our 'front office' who obtain prices from traders located in the same area," he continued. "Tickets are written to define each particular trade, and those tickets go to the 'back office' for processing on Sparks."

On-Line Terminals

Information taken from each ticket is keyed into the system from CRT terminals on-line to a Data General Corp. commercial Eclipse computer.

"The terminal operator keys in the customer and security number," Pagoto noted. "The system accesses the customer and security files and displays the full name and address, as well as other information, associated with that customer and the particular security being traded."

Once the customer and security have been identified, additional data specific to the trade is entered on the CRTs; error messages are displayed on-line until all information is entered properly.

Key data in the new information is verified on a "reentry" basis while less critical items are simply displayed and checked visually. Once the data has been validated, the system performs extensive calculations of yield, principal, interest and total due and then prints multipart fanfolds used for customer receipts and internal transaction-handling documents.

Credit for Implementation

A reduction in Sparks' implementation time was possible because of the availability of Fortran on the one hand and the multikeyed access capability of DG's Infos DBMS on the other, Pagoto said.

Another benefit of Infos, he added, is a space management feature which allows dynamic addition or deletion of indexes, data base records and subindexes.

Because of the reduction in data entry requirements for each transaction made possible by Sparks, the division has reduced its clerical staff.

"But the real advantage is the accuracy and timeliness of management reports which the system prepares automatically — reports on our position in each security and the associated profit or loss, reports on changes in our records and external reports required by the government. In the past, those reports had to be prepared manually," Pagoto noted.

Sparks will be expanded, starting later this year. "The establishment of a central data base makes that possible," according to Sheridan L. Steinberg, Citibank vice-president and head of operations for the division. "We want to automate operations related to delivery of securities as well as our internal accounting operations."

Sparks will ultimately be used to develop an automated mathematical model of trend analysis in the movement of particular securities. This automated capability will act as a supplementary "front office" trading tool to an already existing network of profit optimization techniques, Steinberg said.

In its current configuration, Sparks includes 16 CRT terminals on-line to the Eclipse C/300. The terminals can be switched to a backup Eclipse processor in case of system failure.

The system also contains one 25M-byte disk drive on each processor (although Pagoto said that capacity will soon be doubled) and two 300 line/min printers used to output the fanfolds.

The configuration is housed in a "fail-

(Continued on Page 24)

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Datashare Operations Improved With Better Buffer Management

SAN ANTONIO, Texas — Datashare — Datapoint Corp.'s business time-sharing system — has received a boost in processing speed and the addition of several communications facilities.

The most recent release, Datashere 4, is available to users of the Datapoint 5500-based systems.

The increase in processing speed is the result of an improved disk buffer management scheme as well as more efficient port scheduling techniques, the company explained.

Communications with display and printer terminals have also been improved with the addition of a package that allows the 5500 CPU to send data at transmission speeds up to 9,600 bit/sec, the firm claimed.

In addition, Datapoint's Multilink dispersed file processing feature, which enables Datashare systems to be operated in a multidropped communications environment, has been added.

Remote Files

DS3NET capabilities have also been added to allow data files on remote Datapoint processors to be interrogated and modified interactively under Datashare program control without the need for file transfer to the central site, according to the firm.

Previous releases of the software utility communicated through batch emulators or by partitioning the processor for concurrent Datashare and communications. The programmer now can communicate to the mainframes by writing simple instructions, the company said.

Release 4 of Datashare is available for documentation charges from the company at 9725 Datapoint Drive, San Antonio, Texas 78284.

BCS Network Users Access 'Easytrieve'

MORRISTOWN, N.J. — Easytrieve, the data retrieval system from Pansophic Systems, Inc., is now available to users of the Mainstream service on the Boeing Computer Services, Inc. (BCS) network, according to an announcement from BCS.

Almost any information request can be fulfilled with Easytrieve, from creation of customized reports and mailing labels to development of utility programs and analysis of SMF data under IBM's OS, a spokeswoman claimed.

The Pansophic software also provides the potential for multifile cross-checking and match-merge processing, she said.

Easytrieve supports English-like coding which allows both programmers and those inexperienced in DP to use the system, the spokeswoman said.

BCS's Mainstream-TSO system can be accessed nationwide, she added from network headquarters at 177 Madison Ave., Morristown, N.J. 07960.

'UMS' Aids Projects, Eases Human Effort

(Continued from Page 21)

"Big Brother" that relieves us of having to remember things.

UMS in the hands of the unscrupulous could become a weapon, a sort of mechanical Scrooge hovering over its clerks. However, UMS can also be viewed as a protector if it provides help when we are overloaded and gives us other tasks when we are underemployed.

Many other such social issues have to be examined. The pursuit of progress or automation is rarely immediately good for society, but it is the way we have chosen to live as a nation.

Constable is president of Constable Associates, Inc., a San Francisco-based consulting firm.

'Ifos' Helps Bank Manage Its Securities

(Continued from Page 22)

safe" computer room, including a fire detection/suppression system and a backup generator to develop internal power if need be, Pagoto said.

"We selected the configuration for Sparks largely on the strength of its software, which is superb," he said.

"In eddition to considerations of hardware and software capability, we wanted a supplier able to offer us an upward growth path and equipment compatibility along the way."

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COMMUNICATIONS

X.25 Protocol to the Rescue?

**By John P. Hebert
And Ronald A. Frank**
Of the CW Staff

ATLANTA — The disadvantages of the traditional protocol and networking technologies used in the switched network may soon be bypassed by the use of the CCITT X.25 international protocol in public packet networks.

This was the impression given by Rubin Gruber, President of Cambridge Telecommunications, Inc. at a recent conference sesssion on the international protocol in public packet networks.

The X.25 protocol is now being used by one public network in Canada and by various postal telephone and telegraph (PTT) networks in Europe; Telenet Communications Corp. here is now beginning to use it, according to Gruber and Stuart Mathison, vice-president of corporate planning for Telenet.

From the user standpoint, X.25 is now a development far in the future — rather it is at the user's doorstep, Mathison and Gruber indicated.

The disadvantages of underutilized lines, low reliability, expensive backup and expansion and the dependence on locked-in applications from a locked-in host CPU are all inherent in the present switched telephone network, Gruber said. But these problems will find a solution through the implementation of X.25, he contended.

Public packet networks using the X.25 standard will last longer because they will give users true resource sharing in a distributed processing environment. In addition, they will offer high-speed communications between minicomputers at various points in the network, Gruber said.

Users will also gain total redundancy in the network — if one of the minicomputer processors is not working, another will handle the workload to keep users up, he explained.

Another advantage of X.25 is the ability for a user anywhere in the world to use the public packet network because of the standardization afforded by one protocol, Gruber continued.

The network will also be full duplex with flow control capabilities, and there will be no need to make any software changes in the host CPU to accommodate the protocol because it will be transparent to the host, he said.

Noting that all X.25 functions will be performed in an IBM 370X-type front-end controller, Gruber explained the host will perceive the communications traffic as though the remote terminals were directly attached to the front end.

Besides giving the central site control over a remote terminal on the public packet-switched network, the end-to-end protocol will open new frontiers for data communications applications, Gruber told session

(Continued on Page 30)

Revamp of '34 Act, Bell Bill Topping FCC Policy List

By Edith Holmes
Of the CW Staff

CAMBRIDGE, Mass. — The House Communications Subcommittee's announced intention to revamp the Communications Act of 1934 and AT&T's push for the passage of its Consumer Communications Reform Act head the list of policy issues facing the Federal Communications Commission (FCC), according to an administrator for that agency.

Speaking before a Harvard University Program on Information Resource Policy seminar here last month, Dale N. Hatfield said he could only speculate that "little harm — and potentially much good — could come from a comprehensive review of the 1934 act, even if it merely reaffirms the FCC's interpretations and actions" under that law.

Hatfield, chief of the FCC's Office of Plans and Policy, noted that unlike the rewrite of the Communications Act, the Reform Act — commonly known as the "Bell Bill" — has already been the subject of extensive debate and considerable opposition by the FCC.

This is the first half of a two-part series detailing the future issues facing the Federal Communications Commission (FCC). These issues were raised at a Harvard University seminar last month.

This article focuses on rewriting the 1934 Communications Act and the effects of the proposed Consumer Communications Reform Act on carrier services and terminal equipment. The second article will discuss the possible need for restructuring the common carrier industry and the FCC's role in such an effort.

"If adopted in the form in which it was introduced, the Reform Act would — for all practical purposes — destroy the limited amount of competition that has developed in two areas of communications: the provision of long-haul, specialized common carrier services and the provision of customer-owned terminal equipment," Hatfield said.

It is time for another look at the nation's communications policies, the FCC official maintained. In addition to being 40 years old, the 1934 Communications Act was modeled after earlier legislation directed at a technology produced "by the efficiencies inherent in an iron wheel rolling on an iron rail carrying the physical goods of an industrial society.

"It is hardly reassuring to apply such a regulatory scheme to a technology consisting of a light wave guided by a glass fiber carrying the products of an 'information society,'" Hatfield stated.

He suggested Congress' proposed rewrite of the law include a more explicit definition of "communications common carriage."

Calling the present definition of common carriage "essentially circular," Hatfield said the exact economic and social purposes of common carrier regulation should be reexamined. The conditions under which regulation would be applied should be more carefully spelled out.

Referring specifically to modern technology, he added that certain activities may fit a traditional legal definition of common carriage and so require FCC regulation even though natural monopoly or other conditions for regulation may not exist.

"Changes to the act which would allow the commission to make a conscious decision *not* to impose regulation seem crucial in areas of rapid technology change where market forces or other factors are adequate to protect the puhlic interest," Hatfield said.

AT&T's Reform Act is the result of the "enormous pressure" brought to bear on this monopoly market by rapid technological changes in computers and communications, Hatfield suggested.

The technology has at once created major demands for specialized services from the common carriers and the growth of a myriad of firms capable of supplying new and innovative services and equipment.

"Furthermore, these applications of communications lie right at the heart of the 'information economy' where gains in productivity are so essential," he added.

The Reform Act "is not really directed at the 'faceless bureaucrats' at the FCC; instead, it is directed at stifling the encroachment of competing technologies," Hatfield stated.

Computek Starts Family of Large-Memory CRTs

BURLINGTON, Mass. — Said to have twice the memory of competitive devices, the first member of the Display 16 terminal family for distributed processing has been introduced by Computek, Inc.

The terminal can operate asynchronously or under IBM Binary Synchronous (BSC) or Synchronous Data Link Control (SDLC) communications protocols, according to Computek.

The Series 216 comes in three versions: the single-station 216/10; the multiple-station 216/20; and the 216/30 remote terminal cluster.

Each Series 216 terminal utilizes a General Automation, Inc. 16-bit LSI microcomputer with up to 128K bytes of MOS semiconductor random-access memory (RAM), Computek stated.

In addition to the RAM modules, up to 6K bytes of erasable read-only memory is available as well as a special memory package consisting of 4K bytes of RAM and 4K bytes of programmable read-only memory, the company added.

The Series 216's memory organization features a linked list structure for display refresh implemented in the terminal hardware. Each list can reside anywhere in

(Continued on Page 30)

Free Guide Helps Net Planners

GLEN COVE, N.Y. — Do you really need network analysis and design tools? Should you develop your tools internally? How should you determine what to pay for a tool?

A 30-page guidebook from Network Analysis Corp. (NAC) entitled "Software Tools for Network Design and Analysis" attempts to help the network planner answer these and other questions by examining the use of computer-aided techniques for designing teleprocessing networks and analyzing their performance.

The tutorial review and planning guide provides background material on the evolution of modern network architectures, discusses the role of software tools in network design and analysis and offers practical guidelines to network managers who are contemplating acquiring or developing such tools, according to NAC.

The guidebook is free from NAC at Beechwood/Old Tappan Road, Glen Cove, N.Y. 11542.

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Program Lets Imlac CPU Emulate Tektronix CRT

NEEDHAM, Mass. — Imlac Corp.'s TEK-414 software program reportedly allows users of the firm's PDS-4 CPU to upgrade to an interactive, refreshed graphics system and emulate the functions of Tektronix, Inc. 4014 and 4010 terminals.

The TEK-414 emulator is a display driver and communications link that supports the Tektronix Enhanced Graphics Module features, an Imlac spokeswoman stated.

The emulator can be added to a PDS-4 using Tektronix Plot-10 software to offer refresh and stand-alone capabilities with little or no disruption to users' current system, he claimed.

It also permits a PDS-4 to be connected to telephone lines linked to the host CPU in the same manner as the Tektronix terminals.

In the stand-alone mode, PDS-4 users with Plot-10 software can generate graphics locally, she stated.

An 8K-word configuration of the PDS-4 is required to operate the program, which supports communications up to 9,600 bit/sec and utilizes the PDS-4 RS-232 interface, she noted.

The TEK-414 emulator is provided with new PDS-4s at an additional cost of $20 for the object code. Existing users can get the emulator for $90, the spokeswoman said from Imlac at 150 A St., New England Industrial Center, Needham, Mass. 02194.

Tester Offers Instant Replay

MT. LAUREL, N.J. — A portable, high-speed tape unit that aids data communications diagnostics by recording all traffic on both sides of a data link for instant replay and analysis has been introduced by Spectron Corp.

The Spectron T-511 provides full-duplex data stream tape recording, records line speeds from 50 bit/sec to 56 kbit/sec and accommodates all codes and disciplines, the company claimed.

The unit can store 2.4- to 60 minutes of traffic depending on transmission speed for instant replay and analysis, for storage and later display and analysis or for a permanent record.

Data can be replayed at slower speeds to facilitate troubleshooting subtle problems, it added.

Tapes produced at speeds below 44 kbit/sec can be replayed on a Model D-601 Datascope. Alternatively, tapes recorded at any speed can be replayed on the tape unit itself with a cable connection to any model Datascope for display, Spectron said.

The T-511 is compatible with synchronous and asynchronous transmission modes and uses a magnetic tape cartridge to simultaneously record both sides of the communication channel.

Send and Receive data are recorded along with the Carrier Detect and Request-to-Send signals from the channel interface.

Purchase price of the T-511 tape unit is $5,900. Spectron is at Church Road and Roland Ave., Mt. Laurel, N.J. 08057.

Device Replaces Pairs of Modems

ESCONDIDO, Calif. — The Local Data Distribution (LDD) module is a programmable modem eliminator with an RS-232 interface for in-house or short-range data transmission, according to its vendor, Designed Enclosures, Inc. (DEI).

The LDD replaces modem pairs; it can operate at 11 synchronous data rates from 2,400- to 1M bit/sec, DEI claimed. It can also operate in half- or full-duplex modes to emulate Bell 200 and 300 series data sets, the firm added.

An optional package reportedly increases the distance between the host CPU and remote terminals from 100- to 5,000 ft.

The LDD costs $425 and the extender package is priced at $330, a spokesman noted from 563 N. Citacado Pkwy., Escondido, Calif. 92025.

CO Has 3277-Type CRT

BETHEL, Conn. — Computer Optics, Inc. (CO) is offering a plug-compatible replacement for the IBM 3277 CRT terminal.

The CO: 7777 operates with IBM 3271 or 3272 terminal controllers, runs under IBM's Binary Synchronous Control or Synchronous Data Link Control line disciplines and requires no hardware or software modification, a company spokesman claimed.

The replacement costs $2,973 from the firm at Berkshire Industrial Park, Bethel, Conn. 06801.

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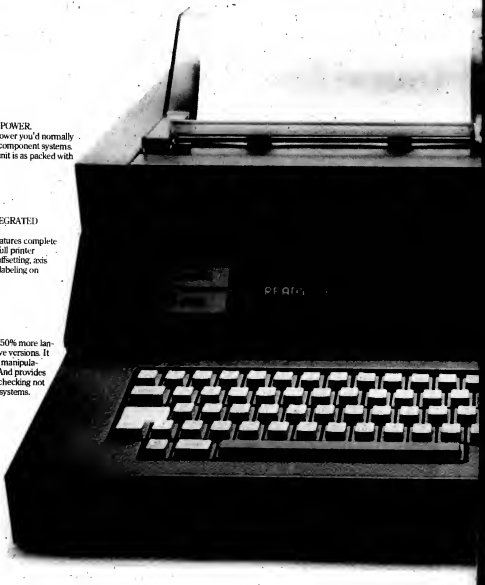

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Olivetti's BASIC features up to 50% more language elements than competitive versions. It offers extensions such as string manipulation and random file handling. And provides features like immediate syntax checking not even available on time-sharing systems.

CPUs Linked to TWX, Telex Nets

CHATSWORTH, Calif. — The Model 560 control system makes it possible for any CPU with a teletypewriter to communicate with TWX and Telex networks without hardware or software changes, according to its developer, Micom Systems, Inc.

The control system provides the electrical interface conversion between the mainframe port's RS-232 interface and the TWX Access Arrangement or Telex Line Adapter supplied by Western Union, the company said.

A microprocessor in the switch allows speed and code conversion to permit the CPU port to communicate with the 50 bit/sec Telex network using the 5-level Baudot code, according to the firm.

A Model 560 system can support up to 12 TWX and/or Telex lines in any combination, Micom said.

Prices begin at $3,300, Micom said from 9551 Irondale Ave., Chatsworth, Calif. 91311.

BR System 90 With 3270-Type CRTs Aimed at Distributed Processing Users

TRUMBULL, Conn. — Bunker Ramo Corp. (BR) has introduced the System 90, a user-programmable terminal display system said to be IBM 3270-compatible, for on-line distributed processing applications.

System elements include CRT terminals with 960- and 1,920-character screen capacities; a programmable control unit (PCU); a display-oriented minicomputer with up to 64K memory; impact printers; and an auxiliary disk storage unit with IBM-compatible diskettes, BR said.

System 90 CRTs are equipped with separate typewriter-style keyboards and are supported by the PCU, the company noted

Each unit features system and terminal status indicator characters, protected fields for forms fill-out applications, local print control and a security keylock.

A smaller 5-in. CRT terminal with 240- or 480-character display capabilities and customizable keyboard is also available, BR noted.

The PCU provides the logic, memory, CRT display refresh, communications control and interface functions for all display terminals and associated devices. It is expandable from the basic 16K to 64K bytes of memory in increments of 8K or 16K modules, a spokesman said.

Terminal Transactions

Designed for a real-time, on-line multiterminal environment, the System 90 is capable of emulating the IBM 3270 or Burroughs TD 700, 800 and 820 series, he said.

In addition to these emulator programs, System 90 software includes the basic operating system, utility programs and a program support package which permits the user to program for more sophisticated applications at each remote location, the spokesman claimed.

IBM-Compatible Mode

In its IBM-compatible mode, the PCU appears to the host processor as an IBM 3270 terminal capable of operating under IBM Binary Synchronous Control (BSC) or Synchronous Data Link Control (SDLC) line discipline, he said.

The control unit's communications interface operates on half- or full-duplex lines at transmission speeds up to 9,600 bit/sec.

The interface can also handle asynchronous transmission at speeds up to 1,600 bit/sec, the company said, adding System 90 modems are available for operation at speeds up to 2,400 bit/sec. The modems reportedly do not require any line conditioning.

In the event of circuit failure, an integral PCU dial-up fallback adapter provides a means of transferring the data path from the dedicated circuit to a pair of switched network lines, according to BR.

The single-disk unit stores about 250K characters on 74 tracks, each containing 26 128-byte sectors; a dual disk is available, BR said.

A typical System 90 installation consisting of six 1,920-character CRTs, the PCU, a single floppy disk, software and a 30 char./sec printer costs about $29,500, the spokesman said from BR's Information Systems Division at 35 Nutmeg Drive, Trumbull, Conn. 06609.

Up to now, you've had to compromise on features to get the overall advantages of a personal minicomputer. But no more.

Olivetti's new floppy disk-based system integrates a thermal printer, keyboard, display, dual floppy drive and processor into a single compact unit. The P6060 can even operate as an on-line intelligent terminal to provide access to large data bases and user libraries. EIA RS232C-compatible devices are connectable with data rates set by software up to 19.2 KHz.

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Data Briefs

Western Union Buffered KSR Offers 120 Char./Sec Speed

MAHWAH, N.J. — A teleprinter reportedly offering up to 120 char./sec throughput with keyboard entry has been introduced by Western Union Data Services Co. (Wuds).

The EDT 1232 keyboard send/receive (KSR) teleprinter has a 1K-character buffer which permits the effective character throughput of 120 char./sec, eliminating the need for carriage return/line-feed "fill" characters, the company claimed.

The teleprinter has an expanded 132-column carriage, a 128-Ascii keyboard with function keys, and numeric pads, Wuds said.

It operates at switch-selectable speeds of 10-, 30- and 120 char./sec in serial form in an attended or unattended mode over the dial-up network, the company said.

The EDT 1232 is equipped with an RS-232 interface. For systems operating in half-duplex mode, an optional interface for Bell 202-type data sets allows line turnaround on specific Ascii characters and reverse channel operation, according to the firm.

The KSR teleprinter costs $3,600 or $150/mo on a three-year lease, including maintenance. Deliveries will begin in August, according to the company at 70 McKee Drive, Mahwah, N.J. 07430.

AJ 860 Designed for T/S

SAN JOSE, Calif. — Anderson Jacobson, Inc. (AJ) has introduced a 60 char./sec desktop teleprinter terminal, the AJ 860, for interactive operation with host mainframe time-sharing or transaction-processing applications.

The AJ 860 features a 9-wire dot matrix print element which reportedy permits 9 by 5 dot matrix printing of upper or lower case characters in a 12- by 9-character cell.

It also features last-line visibility during input and 132-column printing at recovery speeds of up to 90 char./sec, in addition to horizontal and vertical tabulation, reverse line feed, automatic pagination and operator-selectable speeds of 10-, 30- or 60 char./sec, AJ said.

The keyboard includes a 17-key numeric pad, n-key rollover, automatic repeat, self-test diagnostics, dual-gate forms tractor and 94 printable characters, the company added.

The AJ 860 is priced at $2,950 and will be available during the third quarter, AJ said from 521 Charcot Ave., San Jose, Calif. 95131.

FCC Certifies Elcom Terminals

ST. LOUIS — Elcom Industries, Inc. has received approval from the Federal Communications Commission (FCC) for the direct connection of its Authorization Inquiry Terminals to the telephone network.

The FCC approval means the equipment can be connected to the telephone network without a Bell Data Access Arrangement.

Elcom's applicable terminal models are the AT100, VAT200, VAT300 and VAT400, the company stated from 10268 Bach Blvd., St. Louis, Mo. 63132.

Switch Monitors, Times Data

PROVIDENCE, R.I. — International Data Sciences, Inc. (IDS) has introduced a bridging switch designed for bidirectional on-line monitoring and timing of data transmitted between remote sites.

The Model 570 is installed on-line between two modem repeaters at their digital interface. It is capable of operating with modems which have CCITT V.24 and V.35, RS-232C or current-loop interfaces, according to the firm.

It costs $2,300 from IDS at 100 Nashua St., Providence, R.I. 02904.

Intertec Superterm Has Micro

CHARLOTTE, N.C.— Intertec Data Systems Corp. has introduced Superterm, a 120 char./sec terminal with 7 by 7 dot-matrix impact printing.

The standard terminal has an RS-232C interface, an IBM Selectric-type keyboard, 22-key numeric pad, a 256-character print buffer and 132-column printing, Intertec said.

Communications features include optical interfaces, programmable line speeds from 75- to 2,400 bit/sec, programmable line discipline and noise rejection circuits, a spokesman added.

The basic microprocessor-controlled Superterm costs $2,450, the company said from 1851 Interstate 85 South, Charlotte, N.C. 28208.

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Virtual Scheme Seen Surmounting Bandwidth Limits

By Esther Surden
Of the CW Staff

SAN FRANCISCO — A virtual bandwidth scheme can be used to overcome the physical limitations of bandwidth size and offer configuration flexibility on some systems, according to the author of a paper presented at a recent conference here.

Exemplified by use on the Systems Engineering Laboratories, Inc. (SEL) 32 minicomputer, a virtual transmission bandwidth "can be configured to guarantee data overruns never occur," Bjorn Dahlberg, project engineer at Burroughs Corp., stated.

Aimed at optimizing the use of the bandwidth, the scheme can give users smoother access to data, Dahlberg said.

On the SEL 32, an I/O multiplexer handles all communications between the main system bus and the terminal controllers, he explained. Besides storing each controller's memory address, byte count and other information pertaining to channel processing, the multiplexer also handles bandwidth information.

In contrast, I/O multiplexing systems are limited by the maximum transfer rate ofthe multiplexer. This tends to severely limit the number and types of devices that can be attached to a system, he stated.

Under the virtual bandwidth concept, the system monitors the transfer rates of active devices currently executing I/O transfer commands.

If the aggregate bandwidth and the bandwidth of the device trying to access data is greater than the maximum physical bandwidth, then the call is suspended and the device must retry.

In other words, the device must wait until there is enough bandwidth for it to operate successfully, Dahlberg explained.

The only penalty in this case is latency, he pointed out. In some critical real-time situations, such latency cannot be tolerated, but in most cases the lag is insignificant and unnoticeable, he said.

The virtual bandwidth concept can give configuration flexibility: "There are reasons to believe that system configurations are attainable where the aggregate transfer rates of all devices may be many times greater than the throughput of their associated multiplexer," Dahlberg said.

Computek Starts Terminal Line For Distributed Processing Use

(Continued from Page 25)

memory, suiting the terminal for high-density test-processing jobs, a spokesman claimed.

The Model 216/10 single-station system includes the terminal processor, memory, CRT with detachable keyboard and communications interface.

The 216/20 supports up to four local displays within 50 feet of the terminal processor, while the 216/30 is a 216/20 which can be located up to 2,000 feet from the terminal processor, the spokesman said.

Each CRT displays 1,920 7 by 9 dot matrix characters in a 24-line by 80-character format. Each character, Computek noted, can be displayed in five different presentations.

Series 216 CRT

The terminal can support a disk cartridge drive with a 10M-byte capacity, floppy disks or magnetic tape units. It can also support matrix or line printers capable of 60- char./sec through 600 line/min print speeds, Computek said.

Asynchronous communications interfaces available with the terminal system range in selectable speeds from 110 bit/sec to 19.2 kbit/sec; synchronous interfaces range to 9,600 bit/sec, the spokesman noted.

The Series 216 is supplied with disk-based development software, a real-time terminal operating system and data entry, text editor and text processor packages, he said.

The 216/10 with 8K RAM and an asynchronous communications interface costs $5,350. A 216/20 with two CRTs, 16K RAM and synchronous interface is priced at $9,390 or $4,695 per CRT.

A 216/30 configuration with four CRTs, 32K RAM and SDLC communications costs $16,390 or $4,097 for each display

Three- and five-year lease plans are available for first installations. Deliveries of the Series 216 will begin in the third quarter, Computek said from 63 Second Ave., Burlington, Mass. 01803

X.25 Protocol Offers Networking Benefits

(Continued from Page 25)

attendees.

One of these applications that may have a far-ranging impact for the industry would be the possibility of bringing the computer terminal into the home.

And the advantages of a typical IBM 3270-type terminal will be lower cost of the communcations facility and better response times; the host CPU will be relieved of the communications processing load, he said.

During a question period, Dr. Barry Wessler of Telenet Communications Corp. predicted minicomputer vendors will introduce X.25 compatible protocols within the next year. These will be similar to Decnet, which is used by Digital Equipment Corp., he said.

Stuart Erskine of Bell Canada said carrier dial-up services could be eliminated when public packet nets become operational because the packet net offerings are more cost-effective even when they are directly connected to user sites.

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User Must Take B7800 Cuts On Faith Alone

DETROIT — When do users have to accept company announcements of price decreases on faith alone?

When they are like the recent "public" pricing announcement released here by Burroughs.

Although the mainframer announced "new pricing and maintenance policies" on its B7800 series, in several cases a company spokesman could not give previous prices, making it difficult to judge what the reductions actually were.

At the same time the firm claimed to reduce prices on the B7800 series, it also raised the minimum memory size, meaning users just getting machines in the family will have to pay more than they would have under the old arrangment.

On the maintenance prices, Burroughs said it would now make field engineering services available on a 24-hour, seven-day basis as part of the lease price. Previously, the firm said, it charged for such service, but had not publicly priced that service before and would not now issue detailed pricing for what it had cost.

Therefore, users can now get something free that did not have a price tag — or at lease a "public price" tag — in the past.

On other pricing, the firm said it reduced prices on the B7811, B7821 and B7765.

The new monthly lease rate for a B7811 with 3M bytes of main memory is now $55,820; the purchase price is $2,391,940. The old lease rate for a 3M-byte B7811 was $77,527/mo.

However, users formerly could lease a 1.5M-byte B7811 for $53,100/mo or purchase it for $2,497,600, the spokesman said. That option is no longer available.

The monthly lease rate for the dual-processor B7821 with 6M bytes of main memory is now $82,440; the purchase price is $3,528,280. Previously the monthly lease rate was $97,600 and the purchase price was $4,436,800.

A user previously could get just a 3M-byte dual-processor B7821 system, but the spokesman said the firm had never revealed prices for this unit. He didn't know whether any had been sold or for how much.

Finally, the lease and purchase rates for the dual-processor B7765 were reduced 29%, with the new lease price at $40,700/mo and the purchase price at $1,953,600. Previously there was "no public pricing" for this machine, the spokesman said.

DP Managers Can Stop Shuddering

There's Really Only One Way to Erase a Tape: NBS

By Frank Vaughan
Of the CW Staff

WASHINGTON, D.C. — Ask a DP manager what would happen if a worker passed through his magnetic tape storage area with a large magnet in his toolbox. He'll probably shudder at the thought.

But recent findings by the National Bureau of Standards (NBS) may put his mind at ease.

In "Is There More Than One Way To Erase a Tape?" in the December 1976 issue of the NBS publication *Dimensions*, the bureau concluded there is virtually only one way to erase a tape — by using an intense magnetic field at very close range.

That conclusion was drawn from a series of tests conducted by the NBS Institute for Computer Sciences and Technology.

The study noted data on a recorded magnetic tape takes the form of magnetized regions which are converted into electrical signals on playback. It determined these signals can decrease in strength by as much as 50% without impairing the ability of the hardware to detect them clearly; it also concluded no information is lost up to that point.

Tests With Magnets

In tests with a powerful horseshoe magnet, the maximum erasure always took place on the layers of tape closest to the magnet and lessened as the distance from the magnet increased, the study found.

In one test, the magnet was placed 11 millimeters (.44 in.) from the outermost layer of tape. When playback was measured, the tape showed a decrease in signal strength as high as 80% of the normal level at the beginning of the tape.

All information on the first 350 feet of the tape was lost. At the 350-foot point, the signal, which increased gradually with distance, reached 50% of normal and all information on the rest of the tape was recoverable.

When the same magnet was moved to 25 mm (1 in.) away from the edge of a recorded tape, the greatest reduction in playback level was only 22%. There was no loss of recorded information.

At a magnet-to-tape distance of 51 mm (2 in.), there was no measured decrease in the signal strength.

"These results show the stories of severe data loss from the mere presence of a permanent magnet are not true," the report contended.

"However, undetected sabotage is possible and controlled access to tape vaults should be maintained," it noted.

"It was also found the duration of exposure of a tape to a magnet has no observable effect on the degree of exposure — the maximum erasure damage is done instantaneously or not at all.

Other magnetic fields, such as those caused by electric motors, generators and transformers, pose no danger to magnetic media — even at very close range — if the devices are encased in their normal metal shields, the study found.

Magnetic media are also safe from airport X-ray and radar, the study found. Various recorded tapes and cassettes were walked through a number of different types of metal detectors and subjected to X-ray doses with no loss of signal level measured in any exposed tape.

In other test on recorded media, the institute:

- Subjected recorded tapes and cassettes to intense electric fields. Arcs were struck onto the magnetic stripe of plastic credit cards by ignition coils.
- Bombarded the media with 3 megarads of gamma ray doses for 90 minutes.
- Placed a load of 900 kilograms (about 2,000 pounds) on magnetic strip cards.
- Placed recorded media against all of the electrically operating components in the engine compartment of several automobiles.
- Put recorded cassettes into the interior and exterior regions of several color television sets.
- Heated and chilled magnetic strip credit cards to extremes of 182°C (360°F) and -51°C (-60°F.)
- Irridated tapes with microwaves (not heat) in a microwave oven.
- Exposed media to intense infrared and ultraviolet light.

"These tests caused no erasure and strongly indicated the magnetically recorded data on computer magnetic storage media [is] resistant to almost all forms of energy except for intense magnetic fields at close range," the institute found.

"The tests showed there is no need to shield the data stored on magnetic media against X-rays, high voltage fields, nuclear radiation, high frequency fields or light

(Continued on Page 32)

IBM Adds OCR-Based Deposit-Processing System

WHITE PLAINS, N.Y. — IBM has announced a deposit-processing system it said optically reads and then inscribes and balances large volumes of bank checks and their accompanying deposit slips.

Large banking institutions can proof more than 100,000 deposit documents daily using the IBM 3895, the firm said.

The system, which includes the Model 3895 document reader/inscriber and the Model 3896 tape-document converter, uses optical character recognition (OCR) technology to read both hand-machine-printed dollar and cents amounts from checks, deposit slips and other bank documents, according to a spokesman.

The amounts are then inscribed on the documents in magnetic ink by the 3895. The system also prints endorsements and audit trail infomration for subsequent tracking, analysis and processing, he added.

From Control Tapes

The tape-document converter, an electrostatic dry copier, transfers the information from adding machine tapes which often accompany commercial deposits to a check-sized form that can be processed by the reader-inscriber, he noted.

The system will read up to 525 6-in. document/min, sorted into six stackers on the 3895 Model 1 and 12 stackers on the 3895 Model 2.

Tests of the system while operating on-line to IBM 370/125-2 and above CPUs under VS indicated it can successfully read and inscribe approximately half of the documents entered on the first pass, the spokesman said.

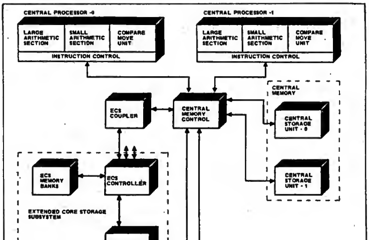
The collected data can be used by the host 370 to update bank and customer records. The 3895 is supported by OS/VS1, OS/VS2 SVS, OS/VS2 MVS and DOS/VS.

Three program products available for the system: check processing control system-deposit processing; deposit processing OS/VS; and document identification description macros.

Monthly lease charges on a five-year contract for the 3895 reader /inscriber models 1 and 2 are $14,770 and $15,170 respectively, with monthly use charges of 9.5 cents and 9.9 cents per 100 item passes. The Model 1 sells for $535,000 and Model 2 for $550,000.

The 3896 tape-document converter is available under lease for $15,000/mo and a monthly use charge of 1.06 cent/copy. It sells for $42,000.

First shipments begin this fall.



A Glance at Cyber 171

NEW YORK — Control Data Corp.'s Cyber 171 system configuration shows the relationship between the host CPUs and the peripheral processor subsystems.

CDC unveiled the Cyber 171 three weeks ago [CW, April 4] along with the Cyber 176, a system it said has 18 times the performance of the Cyber 171, which is comparable to the IBM 370/148.

Channel Interface Links Non-IBM Devices to 360/370

HOUSTON — A channel interface designed to link minicomputers and/or non-IBM-type peripherals to either the IBM 360/370 multiplexer or selector channel is being offered by Information Products Systems, Inc. (IPS).

The Model 383 handles all the high-speed line sequences required when transferring data and status between a peripheral device controller and the IBM channel, IPS said.

The 3837 is said to reduce the IBM interface to a simple request-response I/O function which can be controlled by either herd-wired logic, a microprocessor or a minicomputer.

Controller Relieved

The device controller is therefore relieved from servicing the IBM channel within the IBM CPUs command cycle time, IPS indicated. It allows communications with the CPU at channel speed instead of serial I/O, a spokesmen said.

Connection of non-IBM devices is normally done at e low-speed serial linkup using a dedicated CPU for protocol and transfer, he added. However, with the 3837, the mini being linked with the IBM CPU is not dedicated to the linkup and can perform other functions, he said.

Common Uses

The 3837 is most commonly used to connect terminals and tape drives to IBM mainframes, he noted.

Although channel emuletion software for specific peripherals is not included with the 3837, IPS will provide engineering services to ease integration, he indicated.

The Model 3837 was designed to plug directly into most general-purpose 16-bit interfaces, such as those on the Digital Equipment Corp. PDP-11 and Data General Corp. Nova, IPS said. The maximum number of addresses is 256, the spokesman added.

The channel interface is available in several models. The end-user version, the 3837, costs $7,500 and includes a one-year warrantee, shipping and installation. A 19-in., desk-mountable chassis with power supply, fan and connectors costs $4,700.

The Model 2827 single printed circuit board costs $1,650 in lots over 21 from IPS at 6565 Rookin, Houston, Texas 77074.

HIS Enhances TDC Architecture With Interface Units, Process CPU

FORT WASHINGTON, Pa. — Honeywell Information Systems, Inc.'s Process Control Division has enhanced its Totel Distributed Control (TDC) architecture with a family of remote process interface units for analog and digital I/O processing and a process CPU.

They ere the first additions to the TDC 2000, a microprocessor-based control system for industrial applications.

The process interface units are a family of "smart" remote multiplexer units called the TDC 7100. They are interconnected by a data highway, a single coaxial cable that serves as the communications link among the elements of distributed system, HIS said.

There are three units involved in the enhancement: high-level, low-level and satellite.

The process CPU provides processing functions while maintaining compatibility for users with Series 4000 process computers, a spokesman said. The unit provides up to 256K words of MOS memory with a 600 nsec cycle time.

Prices Vary

Prices for the interfaces vary according to system configuration with high-level units ranging between $7,000 and $95,000. Low-level units cost $7,500 to $130,000 and the satellite units are $6,700 to $130,000.

HIS' Process Control Division is at 1100 Virginia Drive, Fort Washington, Pa. 19034.

Miltope Offering Rugged Printer

PLAINVIEW, N.Y. — Miltope Corp. has introduced a line printer designed for tactical and ruggedized applications.

The HSP3609-212A has switch-selectable 80- or 132-column printout and provides a 64-, 96- or 128-character Ascii alphanumeric subset plus graphics capability at speeds up to 400 line/min, the firm said.

Prints Four Copies

The unit incorporates 14 voice coil transducers and a rotating helical scanner to generate a 9 by 7 dot matrix pattern. It prints up to four copies on pressure-sensitive or teletypewriter roll paper, Miltope said.

The printer is optionally available with a keyboard for dual-function, high-speed printing or single-character data entry.

Lower case characters, foreign alphabets and custom graphics are provided in a 9 by 9 matrix pattern via erasable programmable read-only memory programming, a spokesman added.

The unit comes with a full line buffer and can be interfaced with a modem and used as a communications device, Miltope said.

The printer costs $13,500; OEM pricing is available, the firm said from 9 Fairchild Ave., Plainview, N.Y. 11803.

NBS Tests Ways Of Erasing Tape

(Continued from Page 31)

energy," it added.

A spacing of three or more inches will protect the recorded data from intense magnetic fields that are considerably stronger than will ever be encountered in a normal operating environment, it said.

Dimensions (SD Catalog No. C13.13) can be obtained for $9.45/year from the Superintendent of Documents, Wasbington, D.C. 20402.

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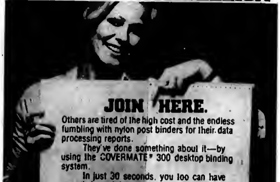

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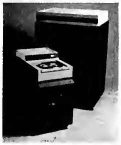

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Word Processor Features Tandem CPUs

SAN FRANCISCO — A word processor featuring advanced text editing, integrated photo composing and data entry by manual keying or optical scanning has been introduced by Tandem Computers, Inc.

Developed by Taft Consulting Corp. of New York, the system, named Compos, utilizes a dual-processor Tandem Nonstop mainframe, companion Guardian operating system and proprietary application software.

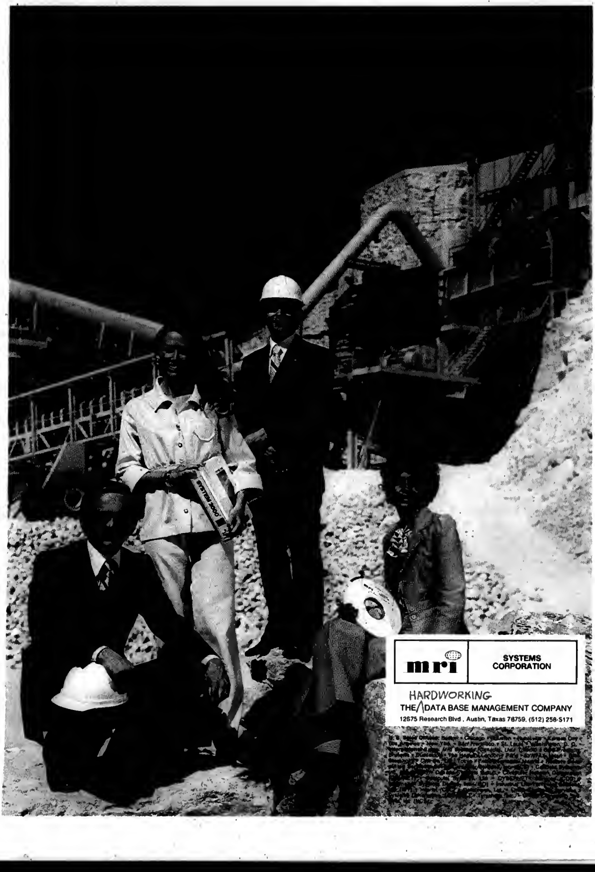
"Compos is aimed at document preparation applications requiring extreme reliability," a Taft spokesman explained.

Compos' power can be equated to that of an IBM 370/155 (with ATS or ATMS application software) but at approximately one-fifth the cost, he claimed.

A Compos system appropriate for a law firm of approximately 100 attorneys and 200 support personnel provides text editing/-photo composition and includes computing capacity for time/-expense accounting and billing, litigation support and arbitrage bond yield calculations.

It is configured with two 256K-byte semiconductor CPUs, four 50M-byte disks, two asynchronous communications controllers, an 800 bit/in. tape drive, a systems console, a 600 line/min printer, a 1,200 word/min optical page reader, a photo composer-processor-developer, seven CRTs and five hard-copy terminals.

The system, including software, costs $413,000 from Taft Consulting Corp., 161 William St., New York, N.Y. 10038.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LAS VEGAS — Air Force and Navy jet fighter pilots regularly fly over the desert sands here, sharpening their combat skills. On the ground, instructors critique each pilot's maneuvers using a CPU-generated real-time color graphics display.

Revolving around a training system built by Cubic Corp. of San Diego, the system permits eight aircraft to engage in dogfight maneuvers simultaneously. The ground instructors see the action on four-foot square color CRT screens and are provided with such statistics as air speed, altitude, angle of attack and "G" load.

Information about the planes is gathered by remote tracking stations which operate with remote battery packs recharged by solar cells:

A single master station for the remote sensing is located on Angel Peak, 7,000 feet above sea level, and outside the range itself.

The control computational subsystem at Nellis Air Force Base here utilizes six Xerox Sigma 9s with a shared memory capacity of 182K.

The display and debriefing subsystem, also at Nellis, consists of four Adage 330s, each with 32K of memory.

Table Has Twin Power

BEDFORD, Mass. — A drafting table featuring twin power drive, wet-ink or ball-point drawing and photoplotting has been unveiled by Kongsberg Systems, Inc. here.

The KS5000 has an effective drafting area of 46 inches by 62 inches with an axial speed of 40 in./sec.

The table with servo drive system costs $65,000 and a total system dependent only on tooling and computer peripherals ranges from $120,000 to over $200,000 from the firm at 10 DeAngelo Drive, Bedford, Mass. 01730.

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Mini Bits

RDS Link Series Has Small Business System

TORRANCE, Calif. — Randal Data Systems, Inc. (RDS) has introduced a small business system as part of its Link series.

Suitable for an office environment, the Link 106 system has a desk enclosure for the components which include a 55 char./sec letter-quality printer, video screen, minicomputer and memory, the firm said.

The minicomputer has 32K bytes of memory and a Model 1104 CRT terminal. A printer and two floppy disk drives with a total of 1.2M bytes of disk storage are also included, the company added.

The system includes Rantext word processing, inventory control, accounts payable and other packages, the firm said.

The basic configuration costs $17,900 from RDS at 365 Maple Ave., Torrance, Calif. 90503.

CCS Adds Job Cost System

HUNTINGDON VALLEY, Pa. — Complete Computer Systems (CCS) has added a job cost accounting system to the options available with its turnkey minicomputer.

The system enables small- and medium-sized businesses to track the estimated vs. actual cost and progress of jobs simultaneously, a spokesman noted.

The programs provide information of scheduling, job status, estimated vs. actual costs, cost variances, employee efficiency, production performance by cost center, inventory, trend analysis and customer, salesman and production analysis.

Based on a Data General Corp. Nova 3 CPU, the system can accommodate up to 256K bytes of memory, more than 11.6M bytes of disk, multiple CRTs and line printers with speeds up to 600 line/min, the spokesman added.

The job cost system costs $6,500 including two weeks of vendor assistance. A basic hardware system costs $23,850, the spokesman said from One Fairway Plaza, Huntingdon Valley, Pa. 19006.

Holder Protects IBM 3 Cards

LOS ANGELES — Beemak Plastics has introduced an unbreakable transport carrier to protect IBM 3 cards when being transported through a plant.

It was designed for use in incentive payroll systems by textile mills, garment manufacturers and other types of industry, the company said.

The cost of the holders is 46 cents each for under 100 holders and 35 cents each in quantities of 100 or more.

The firm is at 7424 Santa Monica Blvd., Los Angeles, Calif. 90046.

Firm Credits Planning

Software Key to Novice User's Success

By Esther Surden
Of the CW Staff

LOS ANGELES — Although hardware is important, software considerations should guide the first-time user, according to Fred Weiss, controller at Edgecraft here.

Weiss credited good software planning with helping to make his system a success.

Edgecraft, which makes shelves, stands and brackets, has a Quantel Corp. small business system which it purchased two and a half years ago, Weiss said in a recent interview.

"Prior to the computer, we had an NCR [Corp.] bookkeeping machine," he recalled.

The decision to computerize was made because the volume of Edgecraft's business was increasing and too many people were needed to take care of the information flow, he said.

"I surveyed what was available," which included talking to sales people, seeing demonstrations, calling current users and finally calling "some people I know" to get their opinions on the hardware and the vendors, he said.

Edgecraft chose a Qantel 1200 system because "it had the ability to grow without changing programming format and all the hardware pieces," he stated.

The firm also wanted to have a communications hookup to teletypewriters in four plants, and the Qantel system gave them the ability to do this, he indicated.

Another reason was that "Qantel made much of its own hardware at the time," Weiss said. Especially attractive was a CRT that had more lines than the others the firm had examined, he noted.

Presently, Edgecraft has a 48K CPU, 24M bytes of disk storage in two drives, a 300 line/min printer and two CRTS. The hardware cost approximately $75,000, he

(Continued on Page 38)

CW Photo by E. Surden

Fred Weiss prepares to demonstrate his small business system.

Major Changes Taking Place Affect the Way Job Gets Done

By Esther Surden
Of the CW Staff

LOS ANGELES — Major changes are taking place in the minicomputer world, speakers at the recent Computer Caravan here agreed, and these changes are affecting the way users get their jobs done.

"A major change is the proliferation of options we have when we address any problem," according to Robert P. Finley, senior vice-president of Home Federal Savings and Loan of San Diego.

"DP is no longer dependent on one vendor," and this "continued snipping of the umbilical cord" is allowing users to determine their own destiny, he said.

The major change taking place is in the development of system software. "Previously hardware technology had far outstripped the capabilities of software on minis," George Tamas, president of Tamas and Associates, Inc. told the group.

The primary changes that are taking place are in the areas of policy, Paul Rosenthal, a senior consultant at Gottfried Consultants, Inc., stated.

"We are reaching the point at which white-collar people are going to get together in unions and they are going to stop the slowdown in jobs that computers have created," he predicted.

User-oriented languages and data base management systems on minis have been the biggest changes recently, according to Dr. Joseph Robertson, director of data systems at the Corporate Information Systems Center at Rockwell International.

These tools have made systems easier to use and have contributed to the large numbers of minis in use today, he indicated.

"The rise in home computers is affecting the way we will do business in the future," William Finkelstein, assistant vice-president of the Planning and Support Division for DP at Security Pacific National Bank, pointed out.

The level of general awareness of the public about the computer is rising," and this will affect the way the computer is used as a tool, he noted.

Varian Gives Its V77 System Floppy Disk Drive Capability

IRVINE, Calif. — Varian Data Machines has a floppy disk system for its V-77 minicomputers.

The system, operating under Varian's Vortex operating system, was designed for data acquisition, remote data concentration and remote job entry applications, the firm noted.

In foreground-only applications, Vortex I with 16K or 32K of main memory supports the floppy system as a remote station to a larger Vortex system or emulation of Hasp or UT200, the company said.

In foreground/background applications, the diskette can be used for transporting generated systems or application program load modules, initially developed on a host system, to other locations in a multiprocessor network, Varian stated.

The system includes either single or dual drives, a formatter and an interface controller. Diskettes are formatted at 120 16-bit words per sector with 295K words for the single and 590K words for the dual drive.

Up to four drives can be configured with one controller and eight controllers may be supported by the operating system, the company added.

Dual-drive systems cost $5,000; single-drive costs $4,000 with deliveries beginning in June, Varian stated from 2722 Michelson Drive, Irvine, Calif. 92713.

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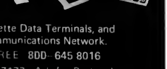

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Without Communications

Distributed Processing Viewed as Outgrowth of T/S

By Esther Surden
Of the CW Staff

LOS ANGELES — Distributed processing without communications was an outgrowth of time-sharing at Security Pacific National Bank, according to William S. Finkelstein, assistant vice-president of the Planning and Support Division for DP.

Speaking before a recent Computer Caravan audience here, Finkelstein noted that time-sharing gave the end-user department computing capability without having to go through the laborious channels of getting approval or having to deal with the DP department.

This evolved to the end-user department having its own small system and being able to "go out and hire someone who can code a little," he noted.

"In any large organization in which you are doing distributed processing, you are usually talking about a little bit more than the traditional small business computer," he told the group. Most of the time, communications does come into play, he added.

For example, he said, his bank faces all kinds of needs. "We right now have a net of [Digital Equipment Corp.] PDP-11/45s" in various locations including New York, London and Los Angeles. The net handles a single application — an international accounting package, he noted.

Modifying Net

The net was sold as a turnkey system, "but we are, of course, modifying it," he stated.

Most turnkey systems almost always need some kind of revision and this one is no exception, he indicated. "We are pulling it through a massive overhaul" to correct things the bank did not like, such as doing "financial computations in floating point," he added.

The 11/45s were chosen for "purely political" reasons, Finkelstein stated. Some time in the future, the bank expects to upgrade its communications on the net either using DECNET — DEC's protocol — or something else, he said.

In another stand-alone application, Finkelstein noted that the bank's subsidiary — a mortgage company in Denver, Colo. — was independent before its acquisition.

It operates with a Honeywell 2040A, which he said has the functional power of a DEC PDP-11/45 or -11/70. The company is running a "small multiterminal inquiry program," he added.

CW Photo by E. Surden

William S. Finkelstein

"We also have an insurance company subsidiary" using minis in a stand-alone application. "They purchased a vendor's turnkey and are now having problems with it. They will be getting rid of the computer" and will be going with a small on-line system to be used in conjunction with a 168, he said.

Another stand-alone small business system takes care of inventory control for the banker's equipment division. It has a huge warehouse and the small business system controls the contents to supply the branches, he said.

First-time Users

Fisrt-time users faced with selecting a small business system see articles that say "you don't need a programmer," Finkelstein noted.

"Usually, people realize they should talk to someone else and in some way they get in touch with a consultant who tells them they probably can get the most benefit by improving their paper flow," but if they want a computer, they'll help them find one, he said.

Firm Reaps Benefits From In-House System

HILLSIDE, N.J. — When an aerospace manufacturing firm here switched from a service bureau to its own on-line system, it found the in-house system gave it more power for less money.

Plessey Industries, Inc. now owns an International Computers Ltd. (ICL) 2903 small business system. Previously, the firm purchased time from an ICL service bureau that used an ICL 1900, according to the user.

Since Plessey developed all of its own data and programs, bringing the system in-house was more than just a trade-off in dollars, the user noted. The most immediate benefit was the accessibility of the system at all times to DP personnel.

Previously using the service bureau's 1900 with magnetic tape, all card punch was done at the Plessey plant and transported to the bureau in New York City. System time was only available at night.

The firm's 2903 includes a 32K-word CPU, CRT console, two 30M-char. exchangeable disk storage drives, a printer and two data entry stations.

A significant factor in Plessey's decision to convert to the service bureau from its previous computer — a General Electric 120 system — was that it enabled the division to make use of the firm's ICL systems from Plessey UK.

The interchange of programs continued, and now programs on tape and disk are transferred to the American system with all new programs written on disk and old programs that are on tape transferred to disk.

Presently, the system runs payroll analysis, sales analysis, gross requirements, shop loading and standard costing applications. Accounts payable and perpetual inventory are planned for the system.

The system is used for one shift, five days a week, approximately 38 to 40 hours, the user concluded.

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Easy-to-Read Display	9 X 12 Matrix for highly legible characters	Yes	No	No	No
	Black on white or white on black display	Yes	No	No	No
	Display at eye level	Yes	No	No	No
	Display set deep in hood to reduce glare	Yes	No	No	Yes
	Full 24 X 80 display	Yes	Yes	Option	Yes
	Full 96 character set, upper and lower case	Yes	No	Option	Yes
	Easy-to-find block cursor	Yes	No	Option	No
Ability to Enter Data Anywhere on Screen	Complete cursor addressing and control	Yes	Yes	Option	Yes
High Operator Throughput	Tab stops that can be set to any column	Yes	No	No	No
	Tab key	Yes	No	No	Yes
Low Operator Fatigue	Backtab key	Yes	No	No	No
	Shiftlock key	Yes	No	No	No
	Typamatic repeat on all keys	Yes	No	No	No
	Separate print key	Yes	Yes	No	No
	Backspace key	Yes	Yes	No	Yes
Convenient Switching Local/On Line	Local-remote mode key	Yes	Yes	No	No
Simplified Interfacing to Printer	Fully buffered port to make printer speed independent of CRT speed	Yes	No	No	No
Easily Accessible Mode Controls	New line enable key	Yes	No	No	No
	Autoline feed key	Yes	Yes	No	No
	Scroll enable key	Yes	Yes	No	Yes
High Speed Numeric Input	Integral numeric pad	Option	No	Option	Yes
Simplified Program Debugging	Transparent mode and displayable control characters	Yes	No	No	No
Cost Effectiveness	OEM price in quantities of 25 for basic unit with 24 X 80 display	$971	$1195	$1080	$1476

*In quantities of 25.

Mini Users Must Gain Awareness of Service Situation

By J. Thomas Evans
Special to Computerworld

Minicomputer Exchenge

Minicomputer users are becoming more and more aware of the expense associated with keeping their systems in operation.

Some sources have attempted to analyze the financial aspects of providing this support and all have come to the wrong conclusion: service is extremely profitable.

As small, reliable purchased systems become a dominant part of the DP marketplace, it is vital that users understand the service situation and their options for reducing maintenance expense.

Service organizations bear two overhead costs. The first is the traditional and well-understood burden of supervisors, managers, facilities, etc. The second is the idle time necessary to ensure that response time for customer trouble calls does not exceed a level acceptable for customer satisfaction.

The necessity for a large amount of idle time is referred to as the "Maytag repairman syndrome" — even if the machines do not break, someone has to be available just in case.

Time Expectations

In the DP industry, expectations are for between two- and four-hour response time. Providing two-hour response time for typical systems requires between 20% and 30% idle time.

It is more interesting to learn that the average percentage of a service representative's time spent on customer sites is between 30% and 40%.

This is the time spent on repair, preventative maintenance, installation, field changes, etc. The remainder of his time is spent on shop repair of failed spares, travel to and from user locations, training and other minor items.

An example using some average dollar values will demonstrate the significance of the foregoing:

Service Reps Hourly Rate	$ 7
Traditional Overhead/Burden	7
Total Cost per Service Rep Hour	$14

You as a user are only willing to pay for services delivered to you. Allowing that one-third of the serviceman's time is visible to you, the company must recover revenue for the remaining two-thirds of his time when he is repairing the spare that failed on your site or learning about the new products that you are ordering.

In this example, the company must recover $42 for each hour of on-site work.

Options for reducing service expense are:

- Overall reduction in the response time requirements to permit increased productivity for the service force.
- A contract with a third-party firm which does not have the traditional overhead. (The president of such a firm will probably be the person who services your machine.)
- Self-maintenance. The modularity and diagnostic ability of new equipment makes this a viable thought. One intelligent terminal vendor encourages it.

Obviously, the first suggestion is less than practical, since the worth of downtime may exceed the maintenance savings and, more importantly, an agreement of industry-wide proportions is required.

The second possibility raises the question of risk. One user described his maintenance contract as a life insurance policy. Spare parts also must be considered in a search for a less expensive source of service.

Parts are a consideration in self-maintenance also. The terminal vendor provides a "do it yourself" kit with parts and instructions.

Evans is o management consultant specializing in the management of field service operations with Business Knowledge in Woodland Hills, Colif.

Readers are urged to reply to this or any other Minicomputer Exchange orticle. This is your column, o chance for you to exchange views on the various topics confronting the minicomputer user, o chance to tell the vendors what you are thinking and to let your fellow mini users know obout pitfolls or new techniques in this area. Letters or monuscripts should be oddressed to Minicomputer Exchange, Computerworld, 797 Washington St., Newton, Moss. 02160. Double space pleose.

Human Element Deters Perfect Software Fit

By Laurie W. Penney
Special to Computerworld

I found Jon David's viewpoint ["Software Package Must Fit Exactly," CW, Jan. 10] to be extremely naive and unrealistic.

After 11 years experience as an in-house systems analyst, a systems engineer for a remote computing vendor and an independent consultant, I have yet to find the software system that fits "100%."

What David failed to consider is the "human connection"; no two people are alike, nor are businesses exactly alike. For that matter, programmers who are given the same problem definition don't write identical programs.

I disagree entirely with David's basic precept, namely turnkey systems. The DP user who is unsophisticated in systems, programming problem definition, etc. needs help.

This is where the independent consultant fits. The independent software consultant can help the novice user to define his problem, analyze the alternatives (which may or may not involve a minicomputer) and perform a software search.

Then, the consultant can ease the user into the system and help him over the rough spots.

The majority of users I've personally dealt with over the years basically don't know where or how to begin.

Less than two weeks ago, I chatted with a potential client whose minicomputer vendor left him "in the lurch" with regard to software and installation assistance. As a result, the installation cycle is now one month delayed, and the user is highly upset.

My point is that the majority of minicomputer vendors leave the customer with a piece of hardware, a stack of manuals and little else. Turnkey systems seldom, if ever, work.

What David ought to be doing, as president of Minicomputer Industry National Interchange, is to search for and promote software of the type that can be used by non-DPers.

Penney is president of Software Engineering Inc. in Newington, Conn.

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Keeps Accounts Current

Small System Saves Candy Company Sweet $110/Mo

By Ann Dooley
Of the CW Staff

OAKLAND, Calif. — Sconza Candy Co. here is saving a sweet $110/mo since converting to a small business system which enables the firm to control its accounts while using existing personnel.

Sconza sells to about 500 customers, which means compiling 15 invoices daily and an additional 15 per day during the peak Christmas season.

The firm needed an accurate and up-to-date accounting system because the volume was too much for it to handle manually, according to Alex Jayme, company accountant.

After trying to operate on a manual basis and then with a service bureau, Sconza finally decided to look into an in-house small computing system.

"I investigated Burroughs, IBM, Digital Equipment Corp., Wang and one or two others," he said, and chose the Wang Laboratories, Inc. WSC/20 system.

The WCS/20 cost much less than the IBM 32 and it was competitive with [DEC], he added.

"Wang had the capability to do what we needed and I liked how they presented themselves," he said.

"Frankly, when we first began looking for a computer, I had never even heard of Wang, but a mechanical engineer friend recommended a Wang system and I'm very happy with it," he said.

Sconza's accounts are now handled by the WCS-20 with two flexible disks and a 120 char./sec printer. The software includes invoicing, payroll, general ledger and three specialized management reports.

The management reports consist of one report which lists the purchases of each customer according to salesman, product and customer.

The second lists what each salesman sold item by item, and the third report lists products sold item by item for the entire operation, Jayme explained.

All three show monthly/year-to-date sales in dollars and quantity in addition to a comparison of the month and year before.

Three copies of each report are needed, Jayme said. "All these accounting functions were too time-consuming for a small staff."

Until two years ago all the invoicing was done by hand, but at that time Sconza turned the accounting systems and the reports over to a management service firm.

"The reports were our primary concern because we had to know exactly what we were doing," he said.

The service bureau produced the management reports and payroll, but Jayme had to code all the invoices at the end of each month. "It was cumbersome and there were always errors from both myself and the service bureau," he added.

Very Long Process

The whole process was very long; it took an entire day to code invoices for the service bureau and another day to cash the receipts, Jayme explained.

"Then it would take five days for our management reports to be finished and, when there was an error, we'd have to wait for the adjustment on the following month's report," he said.

"Now we have complete control of our system, obtain rapid turnaround time on everything, errors and adjustments can be corrected at once and our system can expand as we grow," he said.

The hardware cost $17,200 and the software cost $5,000. It took only six months before all systems were operational, Jayme said.

The $110/mo savings is projected for the first five years over the cost of Sconza's old service bureau. In the sixth year, monthly cost will be only a service contract cost, he added.

Software Called Key To Firm's Success

(Continued from Page 35)

said.

A communications controller allows the firm to transmit orders to its plants in New York, Atlanta, Chicago and Dallas. Each plant has a General Electric terminette terminal.

Recommended Programmer

Qantel recommended the programmer for the system, Weiss said, and the firm was pleased with him. He still works for the company, making additions and revisions on a time and material basis, he noted.

Weiss and the rest of the company's management worked very closely with the programmer during the initial phases, he added.

The company defined what it wanted, saw the programmer's initial results and modified that into the finished product.

The initial phase brought up order entry, accounts receivable, inventory control and communications with an intricate sales analysis report as one of the by-products.

As a service for its customers, the firm provides a report to each customer on sales by color, size or product. This gives the customer a little more control over what he is buying, Weiss noted.

The next stage of operations brought up the general ledger, accounts payable, trial balances and many related reports.

After that, the firm brought up a material production control program, with two distinct parts covering the wood and metal material.

Carefully Designed

The company designed its data base with some care, trying to save precious disk storage space, Weiss said. Therefore, the material production program doesn't take up a great deal of room since it uses much of the same information incorporated in the other programs, he added.

other programs, he added.

The firm upgraded once from its 1200 system to a 1300, a process Weiss called very painless. Service for the system has been very good as well, he noted.

The printer has worked especially well, he indicated: It runs unattended at night, producing the management reports needed for the next day's operations.

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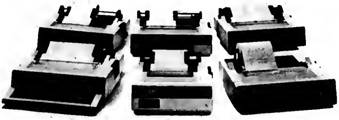

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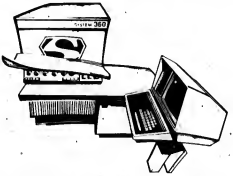

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Minis, Micros and Calculators Easily Distinguished: Rosenthal

By Esther Surden
Of the CW Staff

LOS ANGELES — How do you distinguish between a calculator, a micro and a mini?

Calculators are generally portable, micros are defined by function and don't need peripherals and minis are not portable and need peripherals to run generalized tasks, Paul Rosenthal, senior consultant at Gottfried Consultants, Inc., told a recent Computer Caravan audience here.

The myth that minis are as powerful as their large mainframe siblings must be broken, Rosenthal said.

Minis execute three or four instructions to every one in a mainframe, he noted.

There are two status systems when dealing with minicomputers — the kind that operates in the lab and the kind that operates in the office, Rosenthal said.

The lab status "is based on what you do while the office system is based on how many people do it for you," he explained.

"A good consultant realizes that the applications and technology are only a small part of putting together a system," he said.

All business applications are expendable, he noted. They can be thrown out and started all over again from scratch. It's all politics, he pointed out.

Safest Route

The safest route for a small business is to buy a system from a company that sells a line of systems ranging from very small to very large, Rosenthal said.

That way if you buy a system that is too small for your application you can get a larger mid-range system quickly and with little penalty, he stated.

Paul Rosenthal

Companies such as Digital Equipment Corp. and Data General Corp. are "very good for the person who knows what he is doing," but consultants find themselves "busy substantiating the decision to go with one of them," he said.

Small business systems from companies like Basic/Four Corp. and turnkey systems are the "wave of the future," he continued. The companies supply the hardware, software, training — "the whole works" — he noted. And if the package is successful, "you don't need professionals," he indicated.

In the future, DP professionals are going to find themselves working for vendors.

And with the proliferation of applications software packages and turnkey systems, users will be more and more able to control their own systems without programmers, he added.

Panatec Has Multiuser System

ORANGE, Calif. — Mainsta from Panatec, Inc. is a small business system based on the Intel Corp. 8080-type microcomputer.

Designed for the first-time user, the system features a time-shared multiuser operating system that allows users to attach up to eight CRT terminals to the system, run a separate job on each terminal, yet maintain a 1-sec response time, the firm claimed.

The system includes a set of multiuser financial packages for business accounting. These comprise general ledger, accounts receivable/payable, payroll as well as inventory and order entry.

The firm also has fixed asset, profit-sharing and job-cost accounting packages for the system, Panatec noted.

The packages are written for on-line or batch data entry and provide an audit trail on all transactions. A mailing label package will be available in early summer, a spokesman said.

The applications packages are written in the firm's own language called Panabasic, which is said to combine "file handling capabilities of Cobol" with Basic's "simplicity," the spokesman noted.

A typical system including a CPU, CRT, printer, two floppy disk drives, background processor and the financial software packages leases for about $600/mo including maintenance, Panatec said. The purchase price is about $15,000.

Other system configurations are available, the company noted from 1527 Orangewood Ave., Orange, Calif. 92668.

MSL Turnkey Handles University Admissions

UNION, N.J. — A turnkey system designed to process administrative data for colleges and universities is available from Minicomputer Sales and Leasing, Inc. (MSL) here.

The system, which is based on the Microdata Corp. Reality minicomputer, incorporates over 175 programs in 12 software modules, the firm said.

Called the MSL/Campus, the system allows a college to keep facts known about students before their enrollment in a prospects and admissions module.

A basic accounting modules takes care of accounts receivable, accounts payable and general ledger to conform to the principles of the National Association of College and University Business Officers, the company noted.

Data in the plant and equipment module helps the user develop information about fixed assets, while a personnel module contains information about all employees including the locations of their offices and telephone numbers.

Liability deposits and student loans are also tracked, the firm added.

The registrar module is flexible enough to accommodate an on-line registration process, the firm claimed.

The complete turnkey system ranges in price from $100,000 to $200,000 depending on the hardware selected, the company noted from 4 Gary Road, Union, N.J. 07083.

Digital Pathways Offers Timekeeper for DEC PDP-11

PALO ALTO, Calif. — Digital Pathways, Inc. has introduced a self-supporting timekeeper for the Digital Equipment Corp. PDP-11.

The Timing Control Unit (TCU) -100 indicates the month, day, hours, minutes and seconds, the firm noted.

The TCU-100 is shipped already working and preset to the local time. When the PDP-11 is off, the TCU-100 will continue to operate, using its rechargeable battery, the firm said.

The unit costs $495 from Digital Pathways at 4151 Middlefield Road, Palo Alto, Calif. 94306.

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In-House Mini Proves Cost-Effective

CHICAGO — A batch-oriented card system operating with a large-scale minicomputer has been "highly cost efficient" for Grotnes Machine Works, Inc. here.

The firm, which manufactures custom metal-forming machinery and machinery complexes primarily for the automobile industry, developed the batch-oriented system over the last nine years, according to George Psihogios, manager of DP and office services.

The company's DP history goes back to 1968 when it began using a service bureau. This led to the use of unit-record equipment in conjunction with the service bureau.

In late 1969, the firm went on-line with a remote job entry (RJE) terminal to its parent company — Inland Steel. Later, the RJE terminal was replaced for an intelligent terminal with auxiliary typewriter terminals attached.

In 1976, Grotnes decided to go to an in-house minicomputer and studied the IBM 3, Digital Equipment Corp. 11/45 and Data General Eclipse 300, Psihogios said.

The DG system was chosen, among other reasons, because it was smaller, less costly and generated less heat than the other systems, he indicated.

Management Task

Processing is organized as a data base management task, Psihogios noted. The cards read into the system are used to create and maintain files on disk memories at headquarters, for bill of materials processing, status monitoring and production planning. The same cards are used as the documents sent to various departments to initiate activities and report on results, he said.

As an example, primary bill of material (BOM) system inputs are developed from engineering drawings. A set of cards is punched from information on the prints.

Each card gives contract, job and drawing numbers and identifies a required raw material or standard part line item. The cards are read into the system to create BOM files and are then sent to the purchasing department to initiate orders.

Notations such as purchase order numbers, costs, due dates and vendors are written on the cards, which are then returned to the DP center. The new data is punched onto the same cards, and the results are read directly into the system to augment the files previously created.

The cards are sent along the remainder of the sequence; for example, they go to receiving and are marked when the shipment arrives and then returned for further keypunching and data entry.

The BOM data base is accordingly updated as the job progresses, with the original punched card used at each stage of information entry.

Another set of cards is punched identifying each part when a drawing is released to production, to create the manufacturing data base. These cards are read into the computer to generate the manufacturing files and are then sent to the shop to be used as masters for duplicating part identification onto labor tickets.

The punched tickets are stamped by a time clock when the workers begin and end jobs; the labor tickets are collected and keypunched with the number of hours.

Although DP procedures used in handling the information have changed considerably since system inception, use of cards in a batch entry and reporting mode has proved efficient so there has been little impetus for conversion to other media, Psihogios explained.

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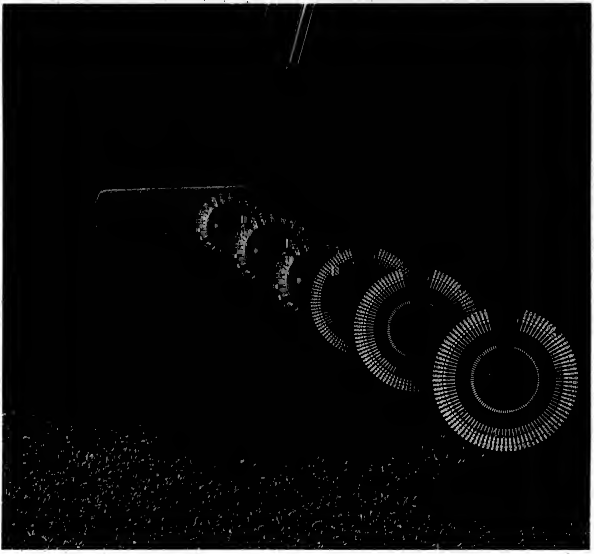

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Still Assessing the Announcement

Most Vendors Unsure About Impact of IBM Price Cuts

By Molly Upton
Of the CW Staff

IBM's recent double-barreled announcement that it had cut 370/158 and 168 prices and developed a processor faster than the 370/168-3 CPU left industry representatives wondering what the aftershocks will be.

Although the price cuts will affect prices on all IBM machines using MOS memory, most vendors were still assessing the announcement last week; only Amdahl Corp. [CW, April 4] and Burroughs Corp. [see Page 31] have reacted with price cuts of their own.

Spokesmen from Honeywell Information Systems and Univac said they are still studying the announcement. NCR indicated it will consider repricing if it thinks such a move is necessary.

Do the price cuts indicate IBM plans a very different line of products which would obsolete its current rental inventory, as American Computer Appraisal Services believes?

And what about the effect on residual value, or the value of used IBM machines?

One memory maker indicated IBM's increasing aggressiveness should destroy the residual value, which has served as a bulwark between IBM and independents' prices.

Lessors and dealers interviewed expressed no panic or rancor, explaining the announcement was not aimed at them but rather at Amdahl Corp.

Comments varied. "It's a huge announcement. Is this the whole thing or is there another shoe to be dropped?" asked Anthony Pintauro, vice-president of marketing at DPF, Inc.

"It could have been worse," Jim Benton, executive director of the Computer Lessors Association (CLA), remarked.

"It's like killing a fly with a brick," stated Tom Murphy, president of Itel Leasing, who was surprised IBM moved so severely to stop the revenue erosion caused by Amdahl.

Others were also surprised IBM would cut prices so dramatically and give up income amounting to about $1 billion in 1977 for a problem that would occur in 1978 and 1979, he said.

"But that's what makes IBM interesting," Murphy stated.

Jim Gafke, executive vice-president of Itel Corp.'s Computer Products Division, said pricing on its AS/5 announced in October anticipated the latest IBM move. Itel does not expect to reprice the unit, he said.

However, the firm announced it is lowering the price of 370/158 and 168 add-on memory to $80,000 per megabyte from about $110,000 prior to the IBM announcement, according to President John Clark.

An add-on memory source indicated he thinks the more aggressive pricing stance by IBM should help destroy the high residual value of IBM products which necessitated a large price discrepancy between independent and IBM products.

Thus, although the margin on prices between IBM and independents' gear is smaller, there is little need for it to be as great as it was in the past, he observed.

With IBM's increasing tendency to compete aggressively on prices, the argument that IBM products are worth more because they have an inherently high residual value "goes to hell," he said.

In the future, people will not attribute as high a residual value to IBM equipment as they have in the past, he commented.

"I think that's significant," he said, citing prices on 512K memory for the 360/65; the IBM price is lower than that of the independents. The IBM block sells in the low $20,000 range whereas the cost for independents' memory ranges in the mid-$40,000s, he said.

The old standby formula was that the independent had to price below the figure arrived at by subtracting the residual value and the investment tax credit from the IBM price.

"If IBM is really going to compete on

(Continued on Page 44)

Memory Price Plunge to Continue

WALTHAM, Mass. — The prices of memory from IBM's Data Processing Division (DPD) will continue to plunge to the new low established by the firm's General Systems Division (GSD) if the future is consistent with the past, according to International Data Corp. (IDC) here.

The market research firm observed the memory price in the IBM 5100 introduction from GSD in September 1975 was an implied $180,000 per megabyte compared with the $260,000 per megabyte then prevalent for larger 370s.

By May 1976, the price of 1M byte of 370/158 and 370/168 memory had been reduced to $170,000.

The latest cut in prices by DPD was to $110,000 per megabyte [CW, April 4]. At the same time, however, GSD was blazing the trail with prices close to $94,000 per megabyte on the Series/1 Model 3.

Could that be where DPD memory prices will go next?

IDC charted the price per byte starting with the 360/30 in 1964 when the tag was $2 per byte. This was halved in 1969 with the 3/10's $1 per byte and dropped to 60 cents per byte on the 370/155 in 1970.

The 370/115 halved the price to 30 cents per byte and it is now 11 cents per byte for the MOS from DPD and down to 9.4 cents per byte on the Series/1 Model 3.

PCM Stocks Put on 'Sell' Lists After IBM 2319, FTP: Analysts

By Catherine Arnst
Of the CW Staff

NEW YORK — New product announcements and price cuts by IBM in the early 1970s caused plug-compatible manufacturers (PCM) to be undesirable investment risks, two financial analysts testified recently at the U.S. vs. IBM antitrust trial.

Actions taken by IBM in the peripherals market served "as a psychological warning to the marketplace" that IBM would not let PCMs encroach on its customer base, according to a 1972 study by Smith, Barney & Co., Inc. used as evidence by the government.

Documents used by government attorney John Soma during the testimony of Stephen Butters of Putnam Management Co. of Boston and Andrew Jakes of Continental Illinois National Bank and Trust Co. of Chicago, both investment analysts, verified that PCM stocks were placed on "sell" lists by these investors after IBM's announcement of the Model 2319 disk drive and the Fixed Term Plan (FTP).

These moves by IBM "probably were a reaction to the success the independents have had in displacing IBM installed disk drive systems," a study of the peripherals industry for the bank said IBM recognizes that over the next five years the major portion of growth in the computer industry will come from peripherals and software — not CPUs," Butters wrote.

(Continued on Page 48)

RJE Market Seen Almost Quadrupling by '84

By Toni Wiseman
Of the CW Staff

NEW YORK — The market for remote job entry (RJE) services will grow from 25,000 clients and $360 million in gross revenues in 1975 to 115,000 clients and $1.3 billion by 1984, according to a study by Frost & Sullivan, Inc. (F&S).

Revenues from health care applications, which are expected to grow most rapidly, will increase fivefold over the decade while revenues from banking and finance will quadruple, the report said.

Scientific applications, on the other hand, which currently account for more than 25% of the RJE market, will decline in relative importance to a 20% market share by 1984.

The number of vendors, meanwhile, will drop from 150 to 100, while average vendor size will grow considerably. "This will result from the substantially greater growth in business applications that are expanding at a 25% rate per annum," F&S explained.

Major RJE vendors, of which R&S identified 10, offer an average of seven other related services, including interactive timesharing, consulting, facilities management, application packages, technical support, training and data base management systems.

Service mix will vary considerably over the next eight years, however, the report

(Continued on Page 44)

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IBM Believed Clearing the Decks

By Molly Upton
Of the CW Staff

BOSTON — The recent pricing moves by IBM [CW, April 4] are part of an orderly inventory liquidation to clear the decks prior to the arrival of a new type of product, according to an analysis by American Computer Appraisal Service.

IBM is planning to offer a new means of handling information and data communications processing functions based on its own communications network and advanced terminal functions, President Sonny Monosson suggested.

"IBM is going to integrate back to where its money, aggressiveness and capabilities leave it room where it only has one competitor, AT&T, which can't get into the DP business," he said.

"To me, that's the only spot in the business where you're going to have the long profit margins that IBM's used to."

The future products, reflecting the rapid technological changes in the industry, will be very different from those around today, he said.

Executive vice-president William Grinker remarked, "The whole purpose is to lay the machines off on customers at good enough prices that they won't be upset when their machine is obsoleted."

By lowering the prices and effectively changing the lease/purchase ratios on products, IBM is encouraging conversion to purchase, Monosson said, which should make 1977 the best year ever for IBM.

He acknowledged financial analysts do not share his view because they see lost revenues stemming from the price cuts.

Vendors Still Assessing IBM Cuts

(Continued from Page 43)

price/performance and try to get people to buy, then it's going to sustain revenues only by coming out with new products. When you come out with new products that obsolete old products, the residual value declines," he stated.

This puts the whole competition game on a "price technology basis rather than on a name basis," he said.

Independents' prices on memory are still below IBM's new level of $110,000 per megabyte, he said.

Electronic Memories & Magnetics Corp. (EMM) plans major enhancements for the 370/145, 158 and 168, according to Tony Coppola, director of sales for the Computer Products Division.

The enhancements will affect the memory as well as the processor and serve as an alternative to upgrading, the firm indicated.

However, Coppola said, EMM has no intention of unilaterally reducing prices in response to the IBM price cuts.

EMM continues to offer significant value at today's market prices, he stated.

"The consensus at EMM is that IBM has hurt margins in some products but created significant opportunities in others. EMM is confident it will be able to continue providing products at margins that meet the company's objectives," he added.

Coppola further indicated EMM intends to introduce memory modules for the 370/138 and 148.

DPF's Pintauro said he is studying the announcement and looking for opportunities.

"It's too early for us to state what effect it will have," he said. "It may be that it's just as reasonable to buy memory from IBM as from the independents."

Itel's Murphy said the announcement has positive and negative effects.

Effect on Portfolio

There is no effect on Itel's portfolio because it doesn't have any large machines on operating leases, he observed.

The reduction in prices on the 158 and 168 will make leasing and purchasing more attractive, but the equipment out on lease will have a slightly lower residual value, he noted.

Nevertheless, he expects business from the advent of the IBM 3033, he said, so overall the effect will balance out.

Benton of the CLA indicated the repricing on the 370/158 and 168 will have some impact, but pricing on those machines in the used market was "artificially high." The move basically constitutes a realignment of where the prices on machines their age should be, he said.

Tom MacArdle, president of the CLA, said lessors probably had estimated the residual value of the 158 and 168 to incur a 30% drop at about this time.

"You've got to plan that IBM will do something every three or four years," he explained.

F&S Sees RJE Mart More Than Tripling

(Continued from Page 43)

said. "Most RJE users have become quite concerned about their lack of control over expenditures for outside services, both time-sharing and RJE," F&S said.

"In response to this, vendors have begun to make administrative control systems available. These not only report computer resource use in detail, but also allow the user to establish and enforce limits on resource use for each valid identification number," the market research firm stated.

Charges Vary Greatly

A survey conducted by F&S revealed that charges for service vary greatly among vendors, as do the bases on which charges are calculated.

Connect charges vary from nothing to $48/hour, partially dependent on line speed, it found.

For other charges, faster turnaround is more expensive; turnaround times range from 1 to 24 hours, with priority choices ranging from two to nine levels depending on the vendor. The highest levels cost up to four times as much as the lowest, the report said.

Mass storage units range from 640- to 204,800 characters with costs in the 10- to 25 cent/mo range for each 1,000 characters, the survey found.

In addition, vendor-site printing charges range from 50 cents to $2 per 1,000 lines, punching from $4 to $10 per 1,000 lines and card read charges from 50 cents to $2.50 per 1,000 lines.

Tape mount charges range from 50 cents to $20 each, forms setup from $3 to $15 and off-line storage charges from $1 to $6/mo for tape and $30- to $56/mo for disk packs, F&S found.

"All vendors will discount, all surcharge some applications and most will guarantee predictability of prices for a given job regardless of contention," the report stated.

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ITC Gets Better Product Fallout From Pollution Control Rules

SUNNYVALE, Calif. — Information Terminals Corp. (ITC) discovered that following the ecological guidelines imposed by its community helped create a superior product line, known as Verbatim, according to a spokesman.

The company was founded in 1969 to supply the computer and word-processing industries with magnetic recording media — cassettes, magnetic cards, floppy disks and cartridges.

In ITC's early years, it bought tape from other manufacturers. Recently, however, as the volume of its business increased dramatically (sales in 1975-76 were over $12 million), ITC decided to invest in a tape manufacturing line, the spokesman said.

Government Approval

However, before any company in the Santa Clara Valley can make a major addition to its plant, it must get the approval of various governmental agencies, the spokesman explained.

One of these, the Bay Area Air Pollution Control District, sat with ITC representatives and established the rules for manufacturing tape.

Tape manufacturing lines in other parts of the country have, until the present time, vented pollution into the atmosphere, particularly the solvent which carries the magnetic particles to the tape. It's very much like painting, and the "thinner" that carries the magnetic particles is called solvent, the spokesman said.

Much of this solvent had been escaping in other plants, and the Bay Area Air Pollution Control people said ITC must make "every effort to recover all the solvent and recycle it," he stated.

Recycling System

ITC's engineering people designed and built a $100,000 recycling system to catch these volatile solvents, trap them in charcoal filtration tanks and return the solvent into the system [CW, Dec. 20].

When the line began to work, air pollution studies soon showed that over 99.8% of all the solvent was being recovered. The air was kept clean, and ITC found itself able to reuse the solvent over and over again, the spokesman indicated.

ITC's production manager, Jerry Newton, seeing that this solvent did not disappear, suggested that he could now invest in a more expensive solvent and still keep production costs equal to or competitive with other manufacturers.

Better Solvent

When asked by management why he wanted to use a more expensive solvent, he said he "could then use a much tougher plastic to form the surface of the tape."

This would give ITC a much longer-wearing tape, a much less-abrasive product and a much greater lifetime for the record-read heads which come into contact with the tape, he explained.

In the past six months, the initial testing to prove out this hypothesis has been finished and is successful, he said.

Dataroyal to Mount OEM Selling Effort And Add Distributors

NASHUA, N.H. — Dataroyal, Inc. currently markets its printers principally to end users for materials handling applications, but President Ron Huch plans to change that.

In addition to mounting an OEM marketing effort, Huch envisions adding more distributors to handle the expanding product line, which now includes the IPS-7 printer as well as the IPS-7K/D printer and communications system [CW, Feb. 28].

The basic IPS-7 offers a good tool for distributors since they can add applications using the capabilities of the system's Intel Corp. 8080A microprocessor, according to Huch.

The micro is available to handle other chores because of the architecture of the printer system, he said.

The 8080A is only 50% to 60% busy when running the printer, which generates variable size characters, he said.

In addition, the IPS-7 handles the overhead associated with variable size characters rather than forcing this onto the host mainframe, as some other printers do, he said.

In its basic configuration, the IPS-7 contains an 8080A, eight I/O registers and 3,000 bytes of memory, which is expandable to 10,000 bytes, the firm said.

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To Solve World's Problems Faster

CDC's Norris Calls for Global Pooling of Technology

LONDON — Timely solutions to global problems such as energy, food and unemployment are being severely delayed because of the inefficient use of technology, according to William C. Norris.

Norris, chairman and chief executive officer of Control Data Corp., called for a worldwide pooling of technological effort to help solve major social problems "before they grow to disastrous proportions."

Speaking to invitees of Inspec, the information services division of the Institution of Electrical Engineers, Norris said "the wheel is being reinvented every day throughout the industrial world while vast amounts of existing knowledge is underutilized.

"A wealth of problem-solving information and technology is literally locked in the libraries and laboratories of business, government, research institutes, academic institutions and individual inventors," he charged.

Norris pointed to CDC's worldwide computer-based technology exchange service, Technotec, as an example of a means of overcoming the communications barrier between those with available technology and those who need it.

Technotec, for instance, is collecting all existing technological data relating to solar energy in an effort to avoid the expensive duplication of effort now going on in countries and among industries trying to harness solar energy, he noted.

Present Scope Too Small

There is a growing — but still limited — recognition of the need for increased cooperation, as evidenced by European cooperation in the aerospace, weather and nuclear fields, he said. There are also government-to-government agreements for cooperation in various fields of science and technology.

But the number and scope of cooperative programs is much too small, he emphasized.

"In the computer industry, no company has any product breakthrough advantages today. Nor have there been any of significance for 20 years," Norris stated.

"Competitive success is gained mainly by doing a better job of solving the customer's problem with application software and professional services support, rather than by possession of superior hardware or basic software. Yet the duplication in research and development in hardware and basic software is enormous," he said.

For industrial companies, cooperation permits significant enlargement of research and development through more efficient use of resources, increasing the likelihood of a breakthrough, he said.

There is really no competitive disadvantage because each partner is free to pursue the market in its own way by concentrating on the unique application of the resulting products to its customer's problems.

This is not just theory, he stated, noting that CDC is already experiencing the benefits of cooperation with others such as International Computers Ltd. But it took eight years to convince other companies to participate, he added.

The main stumbling block was concern over selling the same product in the marketplace, a fear which has proven to be unfounded, Norris indicated.

CDC recently surveyed professional employee views on technology cooperation at the project level and found a "deep conviction" that it is highly advantageous.

Lyet to Help U.S. Sell Savings Bonds

NEW YORK — J. Paul Lyet, chairman and chief executive officer of Sperry Rand Corp., has been appointed to membership on the 1977 U.S. Industrial Payroll Savings Committee by the Department of the Treasury.

Lyet will serve as electrical equipment industry chairman during the 1977 campaign.

He will be responsible for encouraging employees in the industry to sponsor programs to increase the sale of Series E Savings Bonds to employees through Payroll Savings Plans.

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Seven tough problems in "On
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1. System Down—Processor Failure.
2. System Down—Disc Failure.
3. System Down—Repairing Hardware.
4. System Down—Restoring Data Base.
5. System Down—Software Failure.
6. System Down—Changing to a Larger Processor.

Lots of things change when you go "on-line." Mostly for the better. That's why this is the most important trend in data processing today. But the one area which concerns management the most is "What happens when the computer goes down?" It's a good question, and until Tandem introduced "NonStop" processing last year the answers weren't pleasant. Service is interrupted; that's bad enough. But there is worse news still. At the instant of failure, a transaction in process could be lost (or duplicated), a record being updated could be destroyed, or a pointer changed incorrectly could cause the loss of untold records. In short, loss of service is the surface cost. Loss of data base integrity is an even greater problem. Tandem's NonStop System, hardware and software, is the first top-down, designed-in solution to both these problems. To make it even better, we've designed it so it's easy to program, easy to expand; and easily the most efficient transaction processing system around.

1. System Down—Processor Failure.
Every computer will fail sometime. The bigger they are, the more often they fail. Tandem has replaced bigness with a unique multiple processor architecture. Workloads are shared by the processors under control of Guardian, the only NonStop Multiple Processor Operating System available regardless of price class.
When a component fails, Guardian automatically reassigns both processor and I/O resources to ensure that in-process tasks including file updates are completed correctly. You decide the priorities; Guardian does the work. And no interruption of your "on-line" workload occurs. Restart is virtually instantaneous.

2. System Down—Disc Failure.
When one of your disc storage devices fails in the middle of a file update, unknown damage to the record, to record pointers, or to indices can occur. Enscribe, Tandem's NonStop Data Base Record Manager, ensures that the damaged record is restored; and, with our optional Mirror Volume duplicate file technique, that operation is continued using the back-up file. The back-up files are created automatically and are used by Enscribe to improve system response time. When the down disc is repaired so are its files, automatically, by Enscribe. You decide which volumes to back up; Enscribe maintains them, and no interruption of service occurs.

3. System Down—Repairing Hardware.
With any system, a hardware failure must be repaired. But only with Tandem can the system keep operating, right through the failure and through the repair, too. Tandem's Customer Service Representative can remove and replace any failed module in your system without interrupting service. The operators at terminals and the programs in process are totally unaware of either the failure or the repair. And routine maintenance, too, is performed with the system fully operational. This is one more unusual feature of our system, but without it, no system can truly be called "NonStop."

4. System Down—Restoring Data Base.
When a hardware failure occurs during file update in any "on-line" system which is not NonStop, there is every reason to question the integrity of the data base. Integrity of the data base is crucial. For this reason, elaborate procedures to maintain restart points and backup files are required in almost all "on-line" systems. Not with Tandem. Using Guardian and Enscribe, the Tandem NonStop System ensures that all transactions are completed correctly even if a processor, I/O channel, disc controller or disc drive fails during that transaction. Equally important, the system downtime normally required for "restore" and "restart" operations is eliminated.

5. System Down—Software Failure.
System software crashes are an important source of downtime in ordinary on-line systems, but not in Tandem installations. Because all Tandem software is designed and tested to run in a multiple processor environment, it is also designed and tested for failure modes never considered in single processor systems software. Most important, the use of independent processors, each with its own memory, assures that a software failure in one processor cannot cause a failure in a second processor or contaminate the data or programs executing in that processor.

6. System Down—Changing to a Larger Processor.
On-line systems tend to grow, and as they grow they change. New applications, more stations, improved service; all of these result in a need for bigger, faster processors. With Tandem's NonStop System you can actually add processors, add memory, and add peripherals without any re-programming whatsoever. Using Guardian, Enscribe, and Envoy, Tandem's Data Communications method, all user programs and all files are geographically independent. They have to be for NonStop operation. You can also write your programs using a powerful high-level compiler for a multiple processor environment as easily as for a single processor.

7. System Up—Confidence Down.
When an "on-line" system is up, people come to rely on it. And because today's computers are reliable, people have come to rely on them quite heavily. Which makes it even worse when the system does go down, or the information it supplies is wrong. Confidence is severely damaged. And anyone who has tried manual back-up systems knows that they are not the answer. An automatic back-up, non-stop system is the answer. And Tandem has it.

EFT's Future in Retailing Seen Based on Three Factors

BOSTON — The future of electronic funds transfer (EFT) systems in retailing will be highly dependent on developments in three areas — technology, law and economics, according to Richard P. Shaffer.

"The proliferation of data collection devices and media among both financial institutions and retailers is creating an increasingly complex technological environment for EFT system implementation," Shaffer, vice-president of Gambit Management Strategies, Inc., told an audience here recently.

"Fortunately, there are already positive signs that a manageable number of technological standards are emerging and that retail customers are rapidly becoming attuned to the use and acceptance of technological innovations," he added.

Economics may well be the main stumbling block to EFT system implementation, he noted, since the long-range cost savings are offset by immediate front-end hardware costs.

Shaffer emphasized that EFT will be accepted by consumers by 1980 and that consumer resistance will have been overcome.

"We are already seeing this in the case of descriptive billing where the consumer is increasingly accepting the descriptive bill over the country club approach.

"He is giving up the safety and security of seeing a copy of the bill with his signature and probably believes that the advantages of reduced processing costs will be passed along to him in some form at some time in the future."

Shaffer indicated that some of the legal concerns about EFT systems may well be overstated, creating more consumer resistance to change.

Nevertheless, "EFT looms as large, nationwide integrated system which may affect directly or indirectly the lives of some 200 million people. It is hard to conceive that such a system can long survive as a truly free enterprise.

"EFT systems will likely be subject to considerable and continuing government intervention."

The cost of point-of-sale hardware is an important factor for retailers since a supermarket's profit is generally only 1% of sales and a general merchandiser's profit is 3% of sales, he said.

The hardware, on the other hand, averages $5,000 per unit depending on the vendor and configuration, he added.

Prohibitive Charges

Shaffer indicated that some banks estimate that by 1980, the charges required to handle an individual checking account may be prohibitive, and the EFT could be necessary to keep costs manageable.

"Unfortunately, this argument is similar to the argument that has been used by the proponents of the Universal Product Code (UPC) and vendor source marking," he said.

"The potential cost savings to the consumer in such technologies is played down. The avoidance of future cost rather than the reduction of present cost is used to justify system implementation.

"From an accounting standpoint, this may be a legitimate approach. However, it makes for a difficult selling and marketing job to consumers," he stated.

Seminars Set On POS, CBCT

NEW YORK — Frost & Sullivan, Inc., international research and consulting firm, is sponsoring a series of seminars here.

A two-day seminar on new point-of-sale (POS) and customer bank communication terminal (CBCT) product opportunities will he held on June 20-21 at the Statler Hilton.

The seminar will be repeated at the Hilton Hotel in San Francisco on June 23-24.

Semiconductor, microprocessor, high-density disk and FM radio digital send/receive applications will be covered, as well as credit authorization, fraud countermeasures and collection and computerized application screening systems.

A seminar designed to teach management strategies for data communications operations will be conducted at the Sheraton Hotel here on June 13-15.

Sessions will cover the terms, concepts and principles of data communications, describing the hardware options available.

The seminar will also explore transmission modes and media, providing cost data for budgetary purposes.

Further information on the seminars is availahle from Rohert Sanzo, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

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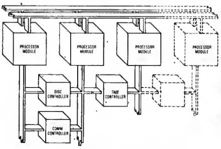
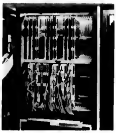
Photo and schematic show three processor modules with space for fourth module, interconnected to disc controllers, tape controllers and communications controllers.





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IBM Actions Hurt PCM Stocks

(Continued from Page 43)

The documents focused on Memorex, Telex and California Computer Products, Inc. Butters had recommended that Memorex stock be purchased on Sept. 8, 1970, but that recommendation changed to "sell" on Sept. 25, after the IBM 370/145 announcement.

"IBM's recent announcement of the 370/145 has serious implications for [PCMs]. This system incorporates a new disk drive called the 2319. There are several technical changes that will complicate life for the independent, but the major problem is effective price cutting by IBM," Butters wrote.

Prior to the 145, IBM marketed the 2314 disk drive at a $5,000/mo rental and the PCMs' 2314 rented at $4,000/mo. The 2319, which was a 2314 with part of the control function moved to the CPU, rented at $3,880/mo.

"The heart of the market effort made by the independent" was to sell at a 20% discount to IBM's price umbrella, Butters wrote. For PCMs to continue to offer that discount on the 2319, they would have had to charge a rental of $3,000/mo, a discount of 25% off their previous price — "probably as high as the margins that these manufacturers expect from their products," he added.

And, on Dec. 16, 1970, Jakes recommended against investing in Memorex because of "two events which transpired in the past two days which led to the 9-point decline in Memorex common stock yesterday: (1) IBM effectively lowered the price of its disk drive systems and (2) earnings for the first nine months of 1970 were restated downward by Memorex" because of a change in accounting methods required by the Securities and Exchange Commission, he wrote.

'About Face'

But IBM's pricing actions had greater impact on Memorex stock than the accounting change, Jakes testified.

The 2319 caused a rapid about-face at Continental Illinois. A report on the peripherals industry dated Dec. 15, 1970 saw the "one bright spot" for PCMs as the 2314-type disk drive, which "continues to represent a very good market potential . . . over at least the next one, maybe two years."

Two days later, an addendum to that report was issued noting "IBM announced a product design and pricing change on disk drive systems to its salesmen on Dec. 14, 1970. The knowledge of this change . . . resulted in sharp decreases in the common stock of Calcomp, Memorex and Telex on Dec. 15-17."

Even though the average access times of the independents' systems were faster than IBM's, in order to stay competitive PCMs would have to lower prices soon, the addendum said.

Most Dynamic Change

In May 1971, "in probably the most dynamic change to date," IBM announced its FTP. With this leasing plan, monthly charges were reduced 8% for one-year rental contracts and 16% for two-year contracts. Penalties were imposed if the lease was cancelled prior to the expiration date and purchase prices were reduced 15%.

Previously, IBM rented its equipment on a 30-day cancellation notice basis with no discounts.

"The new IBM pricing schedule is retaliatory in nature since it precludes an independent from taking an installation where a user has signed a term lease with IBM. It is estimated that perhaps as much as two-thirds of IBM's peripheral equipment systems on rent now are either under a one-year or two-year lease," Jakes wrote.

The FTP allowed IBM to stabilize its customer base, which was eroding as a result of the independents' market penetration, according to Jakes. The market conditions resulting from the FTP and other IBM actions "contributed to the [PCMs] either completely stopping or reducing significantly their production of IBM 2314 plug-compatible systems which have been intended for the U.S. market," he wrote.

BR, Union Ink Contract For 8% Wage Increase

TRUMBULL, Conn. — The Information Systems Division of Bunker Ramo Corp. (BR) and Lodge No. 1882 of District 170, International Association of Machinists, have signed a new three-year contract.

Under the terms of the contract, an effective 8% increase in wages will be given to the bargaining unit in each of the three years of the agreement. In addition, the provisions include improvements in vacation, medical coverage and pension plans.

Some 200 production and maintenance employees at the main facility here and an additional 300 employees throughout the U.S. are affected.

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International News

Israel Welcomes U.S. Makers To Relocate and Gain Tax Break

NEW YORK — U.S. corporations can reduce overall taxation on their manufacturing operations abroad to a low level by locating in Israel, as a result of the new U.S. Tax Reform Act, according to the Government of Israel Investment Authority here.

The Tax Reform Act established a minimum tax level for all U.S. operations abroad. All corporations, regardless of location, must pay at least that minimum tax, and often much more; tax laws in most foreign countries make companies exceed the minimum, the agency said. Israel is one of the very few offshore manufacturing locations to offer this minimum taxation under certain conditions, the agency noted.

The overall combined taxation on a U.S. corporation's manufacturing subsidiary abroad depends on local taxes in the foreign country.

If the foreign country has a low tax rate or no tax, income taxes both in the U.S. and the foreign country combined can be the minimum possible, the agency explained.

Zero Effective Rate

This minimum is zero as long as profits are not repatriated from the foreign country.

If profits are repatriated, under the recent U.S. Tax Reform Act, the minimum is 48% — the federal corporate rate of taxation on profits in excess of $50,000 — no matter what foreign country they originate in, the agency continued.

This minimum combined tax is reached when the foreign country does not tax undistributed profits at all, and the total taxation by the foreign country on distributed or reinvested profits (including withholding tax on dividends) does not exceed a 48% rate.

In many cases, for an almost indefinite period of time, a U.S. corporation with a manufacturing subsidiary in Israel will be able to maintain a zero effective rate of taxation, the authority noted.

This zero rate may result either from direct implementation of Israeli tax concessions or from tax benefits associated with reinvestment of profits earned by the Israeli subsidiary.

New investments and reinvestments of profits in industrial machinery and equipment are fully depreciable in just two years, creating a tax loss that can be carried forward, the agency explained.

Taxes Fully Credited

If, however, profits are repatriated to the U.S., the combined taxation on the repatriated profits in Israel and the U.S. will still be the minimum tax rate applicable to repatriated profits from foreign countries, established by the Tax Reform Act.

Under the Tax Reform Act, taxes paid by a subsidiary in the foreign country will be fully credited and deducted from U.S. tax liability, assuming the total foreign tax rate does not exceed 48%.

Israel's tax rate on repatriated profits, after the tax treaty is ratified, will be lower than 48% for U.S. manufacturers, the agency indicated.

Recent Developments

This tax reduction results from several recent developments in addition to the Tax Reform Act:

- The April 1975 Income Tax Reform in Israel, which grants manufacturing operations a tax holiday by allowing full depreciation of machinery and equipment in two years.
- The Israeli Law for the Encouragement of Capital Investment which provides, by way of grants and loans, up to 70% of the capital needed to purchase fixed assets at the time of establishing a business and an additional grant of 24% during the first four years of export.
- Israel trade agreement with the U.S., which includes Israel in the Generalized System of Preferences, enabling Israeli manufacturing subsidiaries of U.S. corporations to import 2,700 product categories from Israel to the U.S. free of duty.
- Israel's trade agreement with the Common Market, which eliminates duty on Israeli manufactured goods imported into the European Economic Community by July of this year.
- The tax treaty between the U.S. and Israel.

Further information is available from the Government of Israel Investment Authority at 641 Lexington Ave., New York, N.Y. 10022.

Canada's Data 100, Comterm Agree to Combine Operations

MINNEAPOLIS — Data 100 (Canada) Ltd., a subsidiary of Data 100 Corp. and Comterm Ltd. of Montreal, have agreed to combine their remote batch terminal operations in Canada.

As part of the agreement, which is subject to the approval of certain financial institutions, Data 100 will pay Comterm an undisclosed amount of cash and other considerations.

The agreement calls for Data 100 to assume Comterm's obligations to its remote batch terminal customers, market Comterm terminals and provide maintenance for Comterm customers.

Comterm's other operations are not affected by this transaction.

Burroughs Users Get Israel's Clal as Agent

By Alex Ragen
Special to Computerworld

JERUSALEM, Israel — After eight months of being out in the cold, Israel's 17 Burroughs Corp. users have a new agent to look after them — none other than the old agent, Tamkin, Ltd., under a new name — Clal Systems [CW, July 26].

Almost a year ago, Burroughs and the Clal conglomerate, which owns Tamkin, failed to renew their seven-year-old contract.

The contract was awarded to a small firm — International Peripheral Equipment (IPE) — which had until then represented a number of IBM plug-compatible equipment manufacturers.

Service Contract Failed

But none of the Burroughs users made the switch to IPE, preferring to get their maintenance from Tamkin, even though it no longer represented Burroughs.

IPE offered the users a service contract which would have allowed it to terminate maintenance on a piece of hardware on 12 months notice and, as a result, not one user signed it. IPE also failed to sell any computers and, except for a full-page newspaper advertisement which appeared only once, seemed not to be trying.

In July, Burroughs sent a letter to the users expressing regret that the users were dealing with an unauthorized agent and urging them to sign with IPE.

Still, IPE failed to live up to Burroughs' expectations and when, by November, none of the users had signed, Burroughs users received another letter informing them that as of Jan. 1, Tamkin was once again the Burroughs agent for Israel.

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BST Emphasizing Field Service, Training for IBM 3

Special to Computerworld

SANTA ANA, Calif. — In the highly competitive IBM 3 marketplace, keeping the equipment sold is as important as the initial sale.

With this marketing philosophy in mind, Business Systems Technology, Inc. (BST), an IBM 3 peripherals manufacturer, is putting great emphasis on field service and offering classes that intensively train outside service personnel by providing hands-on time with the IBM 3 computers and BST peripherals.

"Since implementing these classes in September 1976, our customer responses that are judged to be critical have gone down by 60%," according to Del Elder, president of BST.

"This improvement has occurred along with a 15% increase in the total number of customers BST serves."

In addition, reports show that customer calls are completed in 30 minutes where it previously took three to four hours because service personnel did not fully understand the equipment.

2,500 Service People

"We contract with Sorbus and Memorex for service on our lines of printers, disk drives, memory and flexible diskette drives," Elder said. "Use of these organizations makes available to BST over 2,500 service personnel to cover our widely dispersed customer base.

"As it's not easy for 2,500 people to become experts on all these products by the use of a service manual, BST set up service classes to give very detailed training in the practical aspects of servicing BST equipment," Elder explained.

The classes also emphasize understanding the IBM 3 customer, which helps service engineers better perform their job, as well as understanding BST's business goals and philosophy," he added.

Presently, the national average service response time for BST is less than two hours and the company is working to improve that time, Elder claimed.

"One of the most important things we teach in the classes is don't keep the customer down for a prolonged period of time and to come directly to BST for help," according to Les Davenport, field training director.

This open-door policy means that internal field personnel with the expertise to solve any problem are on call 24 hours a day. It also means that Davenport; Les Menigoz, vice-president of engineering; Bob Vanderlinder, field service manager; every engineer in the company and even Elder can be called upon to solve a problem at any time of the day or night, he said.

The week-long field service classes are limited to six or eight people. Students include BST, Memorex and Sorbus personnel for a current graduate total of over 400.

There are presently seven classes offered, each one focusing on a BST product or a general overview of the IBM 3.

The class subjects include printer, printer controller, memory, disk drive, disk controller, spooling and the IBM 3.

Contracts

Infotron Systems Corp. has signed a two-year contract with Telecommunications Radioelectriques and Telephoniques (TRT) of Paris to supply data communications equipment marketed by TRT throughout Europe.

Security Pacific National Bank has awarded a contract to Arbat Systems, Ltd. to develop and install a real-time international banking system in seven of its offices in the U.S., Europe and the Far East.

Capital National Bank of Austin, Texas, has extended its facilities management contract with National Sharedata Corp. The agreement calls for National Sharedata to continue managing the bank's DP facilities and to market DP services to other banks and businesses in the Austin area.

Applied Devices Corp. has been awarded a contract by the Michigan Bureau of State Lottery to develop, implement and operate the system for the state's daily on-line game.

Systematics, Inc. has signed a long-term computer facilities management contract with Union National Bank.

Gambit Management Strategies, Inc. has received a contract from N.J.P. Co. to install a Digital Equipment Corp. Datasystem 354 and software to provide a management information system.

Pacific Southwest Airlines has signed a contract with Boeing Aerosystems International for the Compact Programmed Airline Reservation System.

Systematics, Inc. has received a contract from Muskegon (Mich.) Bank and Trust Co. to provide DP services.

Tektronix, Inc. has signed a contract for an undisclosed amount with Millenium Information Systems, Inc. Under the terms of the agreement, Tektronix has agreed to buy Millenium's Universal One microprocessor development system.

Centronics Data Computer Corp. has signed a contract with Nissei Sangyo Co., Ltd. and Hitachi Koki Co., Ltd. for the manufacture and supply of the mechanical assemblies for Centronics' family of medium- and high-speed line printers.

Logicon, Inc. has received a $2.34 million contract from the Air Force Space and Missile Test Center for independent test and evaluation of computer software. Logicon has also been awarded three Navy contracts totaling $441,000 for additional work on the Warfare Analysis and Research System.

Hughes Aircraft Co. has been awarded a $15 million contract by the Federal Republic of Germany Ministry of Defense for the production of Remus electronic test systems.

Inforex, Inc. has received a $4.6 million requirements contract from the U.S. Army Computer Systems Support and Evaluation Agency for key-to-disk data entry systems.

Computer Sciences Corp. has been awarded a $1.5 million software contract from the Federal Aviation Administration to upgrade the agency's enroute air traffic control system.

Teaching your computer to count cornflakes, cookies and whoppers.

A special report on *Source Data Entry* in the May 30th *Computerworld.*

A great deal of attention and effort has been directed toward automating the data entry process over the years. And it's easy to see why. The usefulness of your entire computer system is inextricably linked to the speed and reliability with which you convert raw data to machine-readable form. *Computerworld's* May 30th special report will be looking at just how far we've come with data entry — and, possibly, where we're going.

Edited by Frank Vaughan, this report will take a comprehensive look at source data entry methods, including:

- Places it's commonly used — supermarket check outs, airline reservation systems, hamburger stands, etc.
- A survey of contemporary equipment — scanners, POS registers, badge readers, mag stripe readers, key-tape and key-disk systems, the newer hybrid systems, and the emerging technology of voice data entry.
- An evaluation of the impact distributed data processing (DDP) is having on distributed data entry (DDE) — do these approaches dovetail or does DDP diminish the use of DDE? Are large scale, centralized data entry sites becoming obsolete?
- The state of the art — equipment speeds and technical trade-offs. Innovative applications like voice input and using the telephone as a terminal.
- What's ahead — Input from smaller users just getting into computer automation through data entry; e.g., how merchants regard the costs, projected savings, and their need for automated data entry methods. Possible impact on consumers.

If you're a DP manager, supervisor, or corporate manager who's concerned with the cost effectiveness of DP, be sure you read the special report on Source Data Entry in the May 30th *Computerworld*. If you manufacture and market data entry equipment you'll want to advertise here. Don't miss the May 13th ad closing date. Contact your *Computerworld* salesman — or call Terry Williams at (617) 965-5800.

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Semi Use Seen Tripling, But European Prospects Bleak

MOUNTAIN VIEW, Calif. — Worldwide usage of integrated circuits (IC) will grow from $3 billion in 1976 to $9 billion by 1985; the market is Europe alone will total $2.2 billion by 1985, according to Mackintosh Consultants, Inc. here.

But the prospects for European manufacturers capturing a significant portion of this market look very bleak — unless governments and semiconductor companies can agree on far-reaching radical changes in the present structure of the European semiconductor industry, Mackintosh said.

In a study commissioned by the governments of the Federal Republic of Germany, France, The Netherlands and the UK, Mackintosh found more than 90% of Europe's requirements for large-scale ICs in 1976 came from U.S. firms.

"Vertical integration, upward by the semiconductor companies into pervasive electronic products such as calculators and watches, and downward into ICs by major manufacturers of equipment such as computers, will be a major cause of changes in industrial structure for some years to come," Mackintosh said.

Only a few of these moves will prove viable and fully justifiable in the long term, it added.

Mackintosh indicated that with the possible exception of Philips and its U.S. subsidiary, Signetics, there is no large and successful European IC producer.

It noted, however, that success in the semiconductor component area does not require any secret "ingredient" nor is there any intrinsic reason why a European firm cannot succeed in this industry.

A full report of the study findings will be available this month for $295 from the firm at 2680 Bayshore Frontage Road, Mountain View, Calif. 94043.

International News

Western Europeans Still Favor Rental as Means of Acquisition

LONDON — The acquisition habits of users in Western Europe have not undergone any dramatic changes in the last two years, according to *EDP/Europa Report* (EDP/ER).

"As formerly, the emphasis is still on rental in most countries, the two exceptions being the UK and Switzerland, where purchase remains the principal method of acquisition," the report said.

UK users rented 37%, leased 14% and purchased 49% of their systems in 1971. By 1974, the ratios had changed to 33% rental, 15% lease and 52% purchase. Last year rentals had declined still further to only 28%, while purchases grew to 56%, EDP/ER indicated.

By comparison, West German users rent 69% of their systems, lease 7% and purchase only 24%. France and Italy follow these percentages closely, according to EDP/ER figures.

Scandinavian users rent 50% of systems installed, lease 5% and purchase 45%, but there are variations within the four countries, EDP/ER noted.

The ratios for rentals, leases and purchases are 65%, 6% and 29% in Denmark and 68%, 2% and 30% in Finland. Sweden, on the other hand, shows a ratio of 39% rentals, 5% leases and 56% purchases and Norway a ratio of 36%, 5% and 59%.

The Benelux countries show a similar dissimilarity. Belgian users rent 72% of their systems, The Netherlands only 59% and Luxembourg a mere 34%. Conversely, Belgium and The Netherlands show lease figures of only 10% and 12% respectively, while Luxembourg rents 32% of its systems, according to EDP/ER.

Cullinane Establishes Benelux Venture

BRUSSELS, Belgium — Cullinane Benelux has been established as a joint venture between Cullinane Corp. and two European firms — Douwe Egberts, a Dutch industrial firm, and Sobemap, a Belgian consulting and software services organization.

The formation of the new company coincided with the first annual European IDMS User Association meeting, held in Amsterdam.

Cullinane Benelux is located at Boulevard Du Souverain 348, Boite 15, 1160 Bruxelles, Belgium.

Foreign Orders & Installations

Bonnierdata, a Stockholm-based service bureau, has installed a Univac 1108 system valued at $2.4 million.

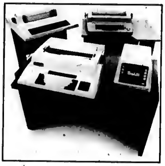
Propal Productora de Papeles, S.A., a Colombian paper manufacturing firm, has ordered a Measurex Corp. 2000/85 digital process control system, including process and operator information displays and management production summaries.

The Yue Hwa Chinese Products Emporium in Kowloon, Hong Kong, has installed an NCR Corp. point-of-service system consisting of NCR 255 checkout terminals linked with an NCR 726 in-store minicomputer.

Cordorniu S.A., a liquor distributor in Barcelona, Spain, has installed a Univac 90/30 system for sales statistics, billing, accounting and payroll applications.

Malenge, a French business forms manufacturer, has ordered a Digitized Information Systems Corp. Digiform system consisting of two digitizers with keyboards and floppy disk drives, a Digital Equipment Corp. PDP-11 with hard-copy printer, a graphic display terminal and Digisetter.

British Columbia Telephone Co. in Canada has ordered an automatic call distribution system valued at $1.1 million from Collins Commercial Telecommunications Division of Rockwell International.



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Who is Miles Benson, and why is he writing about things that went wrong?

Not many people aspire to become experts on failure, but the man behind the pseudonym "Miles Benson" has made a career-long hobby of things that go wrong in the computer business. Collecting information from contacts around the country, "Miles" retires to the back seat of his Studebaker where, for several years, he has turned out columns on catastrophes (and less spectacular failures) for *Computerworld*. Now he has compiled the best of the worst into a single book:

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U.S. Energy Research and Development Administration in Albuquerque, New Mexico is seeking a systems software programmer with a minimum of 2-3 years IBM OS/MVT and VS experience. Experience with MVS, JES-II and TSO highly desirable. Work involves sysgen's, writing and maintaining local modifications to operating software and assistance to applications programmers on dump reading and debugging. Experience with Cobol programming desired. Assembler programming is a necessity. Salary $17,056 to $20,442. Please send resume and government standard form 171 to Stephen G. Buswell at: U.S. Energy Research and Development Administration, P.O. Box 5400, Albuquerque, New Mexico 87115. *An Equal Opportunity Employer.*

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Free transportation, leave and other benefits. Nonfederal, two-year employment. Deadline for resumes April 30, 1977. Send your resume at once to NAS, Dept. ASDP, 1027 Russ Building, San Francisco, Ca. 94104. Permanent residents of American Samoa or those entitled to permanent residency who are not now living in American Samoa will be given full contract benefits, if selected. AN EQUAL OPPORTUNITY EMPLOYER.

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■ **SYSTEMS TEST TECHNICIAN** We'll rely on you to put together systems and check out CPU's and peripherals, as well as debug PC boards down to the I.C. level. You should have an A.E.E. or equivalent experience plus experience with NOVA/Eclipse CPU's. Background with PDP-8/e's would be a plus.

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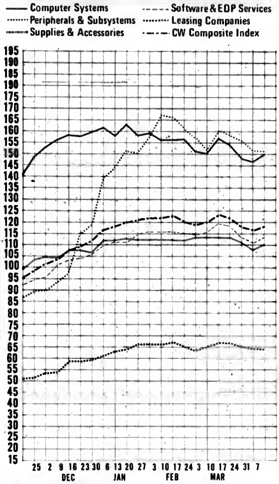

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Shr Ernd	$2.25	$1.32
Revenue	63,218,000	50,150,000
Tax Cred	3,090,000	1,060,000
Earnings	7,476,000	2,055,000
3 Mo Shr	.54	.50
Revenue	17,487,000	13,715,000
Tax Cred	000,000	487,000
Earnings	2,106,000	1,008,000

FOXBORO
Year Ended Dec 31

	1976	1975
Shr Ernd	$5.10	$3.05
Revenue	327,664,000	305,310,000
Earnings	27,403,000	20,068,000
3 Mo Shr	1.60	.00
Revenue	80,249,000	05,350,000
Earnings	7,940,000	5,126,000

GOULD
Year Ended Dec. 31

	a1976 (000)	b1975 (000)
Shr Ernd	$2.96	d$2.34
Revenue	1,225,433	735,827
Earnings	68,042	38,278
3 Mo Shr	.82	d.62
Revenue	362,799	100,231
Earnings	21,474	10,207

a-Includes results of ITE Imperial Corp., purchased in April 1976. b-Reflects change from fiscal year ending June 30 to calendar year ending Dec. 31. d-Adjusted for August 1976 three-for-two stock split.

MANAGEMENT ASSISTANCE
Three Months Ended Dec. 31

	1976	1975
Shr Ernd	$.50	e$.40
Revenue	35,142,000	28,380,000
Tax Cred	1,301,000	1,525,000
Earnings	3,807,000	2,085,000

e-Adjusted for October 1976 one-for-four reverse stock split.

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EXCH		PRICE 1976-77 RANGE (1)	PRICE CLOSE APR 13 1977	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	AMDAHL CORP	23- 40	28	+2 3/4	+10.8
N	BURROUGHS CORP	61-108	62 7/8	+1 5/8	+2.6
C	COMPUTER AUTOMATION	10- 25	23 1/4	- 1/4	-1.0
N	CONTROL DATA CORP	18- 27	21 5/8	+ 7/8	+4.2
N	DATA GENERAL CORP	40- 80	41	- 3/4	-1.7
O	DATAPOINT CORP	20- 46	21 1/4	+ 1/4	+1.1
N	DIGITAL EQUIPMENT	41- 80	41 1/4	- 1/4	-0.6
N	ELECTRONIC ASSOC.	2- 5	2 1/8	0	0.0
A	ELECTRONIC ENGINEER.	7- 16	9	+ 1/4	+2.8
C	FOUR-PHASE SYSTEMS	13- 21	15 1/8	+ 7/8	+6.1
N	FOXBORO	28- 52	51 3/4	+2	+4.0
O	GENERAL AUTOMATION	4- 11	6	- 1/4	-4.0
C	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	69-117	73 3/4	+1 3/8	+1.8
N	HONEYWELL INC	34- 56	48 1/4	+1 1/8	+2.3
N	IBM	227-288	273 3/4	-1 3/4	-0.6
O	MANAGEMENT ASSIST	1- 9	5 3/4	- 3/8	-6.1
C	MEMOREX	17- 33	26 1/2	+1 7/8	+7.6
O	MICRODATA CORP	7- 28	7 5/8	0	0.0
C	MODULAR COMPUTER SYS	3- 14	8 3/8	+ 1/4	+4.0
N	NCR	24- 38	35 1/4	- 3/4	-2.0
O	PRIME COMPUTER INC	4- 18	14 1/8	+ 3/8	+2.7
N	PERKIN-ELMER	18- 27	18	0	0.0
N	RAYTHEON CO	46- 67	59	+3 1/8	+5.5
N	SPERRY RAND	35- 52	34 3/4	-1	-2.7
C	SYCOR INC	9- 31	9 5/8	- 3/8	-3.7
A	SYSTEMS ENG. LABS	5- 10	5 3/8	- 1/8	-2.2
N	VARIAN ASSOCIATES	12- 19	18 5/8	+1 7/8	+11.1
A	WANG LABS.	11- 20	15 3/4	0	0.0
	LEASING COMPANIES				
O	BOOTHE COMPUTER CORP	1- 9	10 1/8	+ 1/2	+5.1
C	COMDISCO INC	3- 13	10 1/2	+ 1/2	+5.0
O	COMMERCE GROUP CORP	2- 3	2	- 1/4	-11.1
A	COMPUTER INVSTRS GRP	1- 3	1	- 1/8	-11.1
M	DATRONIC RENTAL	1- 8	1	0	0.0
A	DCL INC	1- 2	1 1/4	0	0.0
N	DPF INC	5- 8	6 3/4	- 1/4	-3.5
N	ITEL	6- 16	13 5/8	- 1/8	-0.9
N	LEASCO CORP	8- 22	19 1/2	0	0.0
O	LEASPAC CORP	0- 1	1	0	0.0
C	NPG INC	0- 1	1/8	0	0.0
A	PIONEER TEX CORP	6- 11	8 1/4	+ 1/8	+1.5
N	U.S. LEASING	7- 12	11 1/4	+1 1/4	+12.5

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		PRICE 1976-77 RANGE (1)	PRICE CLOSE APR 13 1977	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
C	ADVANCED COMP TECH	1- 3	1	0	0.0
O	ANACOMP INC	6- 11	7 1/2	0	0.0
A	APPLIED DATA RES.	2- 7	5 5/8	0	0.0
N	AUTOMATIC DATA PROC	17- 35	25	+ 1/4	+1.0
C	COLEMAN AMERICAN COS	2- 6	1 7/8	+ 1/4	+15.3
O	COMPU-SERV NETWORK	3- 15	13 1/4	- 1/4	-1.8
C	COMP ELECTION SYSTMS	5- 9	6 3/4	+ 1/2	+8.0
C	COMPUTER HORIZONS	1- 2	1 1/4	+ 1/4	+25.0
C	COMPUTER NETWORK	2- 8	5 3/4	0	0.0
P	COMPUTER SCIENCES	4- 9	7 3/8	- 1/8	-1.8
C	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
C	COMPUTER USAGE	2- 8	2	- 1/8	-5.8
C	CONSHARE	2- 9	5	0	0.0
O	DATA DIMENSIONS INC	2- 5	4 1/8	0	0.0
O	DATATAB	1- 2	2	0	0.0
N	ELECTRONIC DATA SYS.	12- 19	16 1/2	+ 3/8	+2.3
C	INSYTE CORP	1- 3	1 5/8	0	0.0
C	IPS COMPUTER MARKET.	1- 2	3/4	0	0.0
O	KEANE ASSOCIATES	2- 4	3 1/8	0	0.0
C	KEYDATA CORP	1- 5	2 3/8	0	0.0
A	LOGICON	3- 16	14 7/8	+ 3/8	+2.5
A	MANAGEMENT DATA	1- 3	1 1/4	0	0.0
A	NATIONAL CSS INC	13- 25	20	+ 1/2	+2.5
C	NATIONAL DATA CORP	4- 7	5 1/4	+ 1/8	+2.4
A	ON LINE SYSTEMS INC	17- 23	17 7/8	- 5/8	-3.3
N	PLANNING RESEARCH	3- 5	3 5/8	- 1/8	-3.3
O	PROGRAMMING & SYS	1- 1	3/4	+ 1/8	+20.0
O	RAPIDATA INC	2- 5	1 7/8	+ 1/4	+15.3
C	REYNOLDS & REYNOLDS	13- 21	17 1/4	+ 1/2	+2.9
O	SCIENTIFIC COMPUTERS	1- 2	1 7/8	0	0.0
O	TYMSHARE INC	14- 20	17 1/4	+ 1/2	+2.9
A	URS SYSTEMS	3- 5	4 1/4	+ 1/8	+3.0
N	WYLY CORP	1- 7	1 3/8	- 1/8	-8.3
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	8- 14	11 1/4	+ 5/8	+5.8
O	ADVANCED MEMORY SYS	4- 10	7	0	0.0
N	AMPEX CORP	5- 10	8 3/8	+ 1/4	+3.0
O	ANDERSON JACOBSON	2- 4	3 3/8	- 1/4	-6.8
N	APPLIED DIG DATA SYS	10- 25	11 1/4	- 1/8	-1.0
O	BEEHIVE MEDICAL ELEC	3- 12	10 3/8	+ 1/8	+1.2
A	BOLT,BERANEK & NEW	7- 11	8 7/8	0	0.0
N	BUNKER-RAMO	5- 12	10 7/8	+ 3/8	+3.5
A	CALCOMP	3- 7	2 3/4	- 1/4	-8.3
C	CAMBRIDGE MEMORIES	0- 6	1	0	0.0
N	CENTRONICS DATA COMP	20- 36	24 1/4	+ 3/4	+3.1
C	CODEX CORP	22- 47	44 1/4	-2	-4.3
C	COGNITRONICS	1- 1	7/8	0	0.0
O	COMPUTER COMMUN.	1- 6	5	- 3/8	-6.9
C	COMPUTER CONSOLES	4- 7	4 1/2	+ 1/4	+5.8
O	COMPUTER EQUIPMENT	1- 3	2 5/8	+ 1/2	+23.5
C	COMPUTER TRANSCEIVER	1- 3	1 1/8	0	0.0
O	COMTEN	4- 13	10 5/8	- 3/4	-6.5
N	CONRAC CORP	20- 27	25 7/8	+1 7/8	+7.8

EXCH		PRICE 1976-77 RANGE (1)	PRICE CLOSE APR 13 1977	PRICE WEEK NET CHNGE	PRICE WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	1- 5	5 1/4	- 1/4	-4.5
O	DATA 100	8- 13	7 1/8	- 1/4	-3.3
A	DATA PRODUCTS CORP	5- 15	10	- 1/8	-1.2
O	DATA TECHNOLOGY	1- 3	2 5/8	- 1/8	-4.5
C	DATUM INC	1- 2	1 1/2	0	0.0
C	DECISION DATA COMPUT	1- 4	1 3/4	- 1/8	-6.6
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
N	ELECTRONIC M & M	1- 5	4 1/4	+ 1/8	+3.0
O	FABRI-TEK	1- 2	1 3/8	+ 1/8	+10.0
O	GENERAL COMPUTER SYS	0- 2	1/2	0	0.0
N	HAZELTINE CORP	4- 12	10 1/8	+ 3/8	+3.8
M	HARRIS CORP	27- 38	37 3/8	+1 7/8	+5.2
A	INCOTERM CORP	9- 20	13 3/4	+ 1/4	+1.0
O	INFOREX INC	3- 7	5 5/8	+ 1/2	+9.7
O	INFORMATION INTL INC	10- 18	11 3/4	+ 1/8	+1.0
C	INTEL CORP	44-109	44	-2	-4.3
A	LUNDY ELECTRONICS	3- 7	5 3/8	- 1/8	-2.2
O	MSI DATA CORP	3- 8	7 3/8	- 1/8	-1.6
N	MOHAWK DATA SCI	3- 10	5 5/8	+ 1/8	+2.2
O	PENRIL CORP	1- 3	4 3/8	+ 1/8	+2.9
A	PERTEC CORP	3- 9	7 1/4	+ 1/8	+1.7
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 10	2	0	0.0
C	QUANTOR CORP	4- 6	4 3/8	0	0.0
O	RECOGNITION EQUIP	6- 11	7 1/2	- 1/4	-3.2
O	SCAN DATA	1- 4	1 1/4	+ 1/8	+11.1
O	STORAGE TECHNOLOGY	9- 13	10 1/2	+ 1/8	+1.2
C	T BAR INC	5- 10	9	+ 1/8	+1.4
O	TALLY CORP.	4- 6	5 1/8	0	0.0
O	TEC INC	3- 9	7	+ 1/4	+3.7
N	TEKTRONIX INC	45- 69	59 1/4	+ 1/4	+0.4
M	TELEX	2- 5	2 5/8	0	0.0
C	WILTEK INC	1- 2	1/8	0	0.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	2- 5	2 3/8	0	0.0
A	BARRY WRIGHT	6- 13	12 3/8	+ 7/8	+7.6
O	CYBERMATICS INC	0- 1	1/2	0	0.0
O	DUPLEX PRODUCTS INC	13- 24	16 1/4	- 1/2	-2.9
N	ENNIS BUS. FORMS	6- 8	6	- 1/8	-2.0
C	GRAHAM MAGNETICS	8- 14	12 3/4	+ 1/2	+4.0
O	GRAPHIC CONTROLS	13- 19	15	+ 1/4	+1.6
N	3M COMPANY	49- 86	50 3/4	+1 1/4	+2.5
O	MOORE CORP LTD	31- 51	31 3/4	+ 1/2	+1.5
N	NASHUA CORP	11- 20	16 1/2	+ 7/8	+5.5
C	STANDARD REGISTER	15- 21	20	+ 3/4	+3.8
O	TAB PRODUCTS CO	5- 17	15 3/4	+ 1/2	+3.2
N	UARCO	19- 25	19 3/4	+ 3/8	+1.9
A	WABASH MAGNETICS	4- 14	12 5/8	- 1/8	-0.9
N	WALLACE BUS FORMS	18- 25	17 7/8	- 3/8	-2.0

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